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THE

INDIAN FORESTER.

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Recruits for the Forest Department

II

The dearth of qualified candidates for entry to the Imperial Forest School, through which alone the Provincial Service of the Forest Department is recruited, becomes remarkable and almost unaccountable, when it is remembered how Natives come forward in shoals as *omédwars* for any and every Government appointment that falls vacant.

It used to be stated that the prospects offered by the Forest Department were not good enough. But that can no longer be said, for young men, who can pass through the School and obtain the Ranger's certificate, have an opening which compares favourably with the prospects in any career open to Natives of India. The salaries of the different grades of the Class of Ranger to which passed students are appointed direct from the School, or to which they obtain very speedy promotion, rise from Rs. 50 to Rs. 150 a month, and after an approved service of not less than five years as Ranger, eligibility for promotion is earned to the Class of Extra Assistant Conservator on salaries ranging from Rs. 200 to Rs. 350 a month. Further, a specially selected number of these Extra Assistant Conservators, who may prove themselves competent to hold charge of the more important Divisions, have the still better prospects of advancement to the Class of Extra Deputy Conservator, of which there are four grades of salaries *viz.*, Rs 450, Rs. 500, Rs. 550 and 600 a month.

In spite of the above inducements to join the service, the number of private students who can be found to pass a simple Entrance Examination in English and Elementary Mathematics, and to defray the cost of keeping themselves during the 21 months training at Dehra, estimated at Rs. 735, remains extremely limited.

Can it be that Indian parents are too apathetic and too little alive to their children's future welfare to risk the investment of so small a sum on securing for their sons' certain employment on pay which may reach Rs. 600 a month, and from which they may eventually retire on a pension, perhaps, four or five times greater than the income they themselves (the parents) have ever enjoyed?

There are strong grounds for supposing this to be the case, since neither the dislike to a Forester's rough life, nor the fear of so elementary a test as the Entrance Examination, can be the deterrents

Whatever may be the cause, the main recruitment of the Provincial Service, to the wonder of observant Europeans, is at present effected with difficulty and by means of

(*a*) A too low standard of Entrance Examination.

(*b*) A stipendiary inducement from Government of Rs. 30 to 50 a month during the 21 months residence at Dehra :—

whereas it might be reasonably expected that candidates would flock in from all sides ready prepared to undergo a competitive Entrance Examination and anxious to gain a Rangership at the cost of the expenses at Dehra, just as young Englishmen compete for Entrance to Coopers Hill and gain admission to that branch of the service recruited in England at an outlay little short of £2,000. Parents in India generally spend money, which they doubtless often have to borrow, on marriage and other ceremonies, which, if devoted to starting their boys in life, could not be more profitably invested than by seeing them settled in the Provincial Forest Service. If a similar service were open to competition in Europe, private tutors would no doubt come forward and earn livelihoods by coaching young men for the Entrance Examination; and it is possible that speculative individuals would do a profitable business by financing the impecunious through their term of technical training in return for a percentage of the pay of their first years.

If Natives had been taught to pay for their higher education from the beginning, this state of things might be existent here and students might be found ready not only to defray the cost of living at Dehra, but to pay for the educational advantages and render the Forest School self supporting Now the problem of discouraging the stipendiary and of attracting the private student is by no means easy. The naturally gradual way would seem to be to reduce the stipends either in number or amount, and eventually discontinue them. But either course is beset with a serious obstacle, the former will cause a similar reduction in the number of students, and the latter will lead to students being admitted with insufficient means to maintain themselves in health and respectability while at the School.

It is thought that the present system must be continued for a number of years, until through the long process of time necessary for such conviction, native opinion comes to be convinced of the full benefits of a Forest career.

The course of training at Dehra Dun includes both practical and theoretical teaching in a wide range of subjects, and, while affording the best students the opportunity of gaining 'Honours,' and with this distinction, material advantages in the quickness of

their future advancement, it is well calculated to develop in all that aptitude for forest work and keenness of observation, without which they cannot gain the further knowledge and experience necessary to make them useful officers of the service. With an institution like the Imperial Forest School, and the numbers of State-educated Natives seeking employment, it should only be necessary to bring home to these latter the advantages to be gained through the School, in order to secure an abundance of recruits for the Provincial Forest Service.

The Hill Forests of Java.

(*A translation from the Först and Jagd Zeitung.*)

II

The Forests between 5,000 and 8,000 Feet elevation.

a. The cloud zone of West Java.

The forests of the moist zone are very similar both in East and West Java. If a difference exists, it is that in East Java, the number of species is not so great and the species that are represented are not those which are so dependent on excessive rainfall. But in the forest zone now under consideration the difference is very marked. In East Java this zone is covered with open forests of *Casuarina Junghuhniana*, whilst in West Java dense mixed forests cover the slopes. The principal differences between the moist forests and those in the zone immediately above them are as follows :—

1. The temperature at an elevation of 2,000 metres, (taking the average temperature at sea level to be 27·5° C. and allowing 0 56° C. for each rise of 100 metres) would average 16·3° C and this is just at the elevation where the characteristics of the present zone are most marked. Variations in the average temperature are, at least in West Java, of not sufficient importance to seriously affect vegetation.

2. The intensity of direct sunlight and sun's heat should have some effect, but no exact *data* are available. As the forests are covered in this region nearly all day long by clouds, the sunlight can not have the same effect as, for example, on Alpine peaks, where this factor compensates for the low temperature of the air. Itmust, however, cause increased transpiration and evaporation .

3. Atmospheric pressure at 2,000 metres is, of course, much less than in the lower forests.

4 With regard to rain and cloud, the zone can aptly be called the "cloud zone," for, especially in the well wooded areas, heavy rolling clouds begin to form as early as 9 a. m. covering

everything in their folds till 3 p m., when, breaking up in, sometimes, a dozen simultaneous thunder storms, they disperse and allow the evening sun to shine on the flowery canopy of the forests. If these thunderstorms do not take place, the forests remain wrapped in mist, so dense and damp that one cannot see 25 yards ahead whilst the Hygrometer stands at saturation point.

5. In spite of the continuous clouds, the actual rainfall in this zone is much less than in that immediately below it, for the saturated air sinks and deposits rain in the lower forests

6. The relative moisture of the air is very high and sometimes reaches saturation point; but falls considerably during sunshine. In the same day the relative moisture may vary from 49° at 6 a. m. to 100° at 6 p. m.

Put concisely, the climatic characteristics of the cloud zone are as follows:—The temperature is not favorable to tropical vegetation, and tropical growth is replaced by sub-tropical and temperate vegetation. But most remarkable is the excessive humidity of the air in connection with the comparatively small rainfall; the presence in the air of a fine spray which covers all vegetation and also the soil with moisture without penetrating deeply; the occasional fine weather accompanied with a dry atmosphere, which, combined with the low atmospheric pressure and intense sun's power causes rapid transpiration and evaporation. These characteristics of climate are impressed upon the forest growth in this zone.

In East Java, the formation of cloud generally ceases during the dry season, but continues as in West Java during the wet season; a circumstance which is responsible for some differences in the conditions of vegetation in the two localities.

We can now proceed to consider the forests which exist in the cloud zone of Java. The characteristics of these forests point to the existence of a lower temperature than in those of the zone first described, although, of course, there must be an intermediate region, where tropical passes into temperate vegetation. There are fewer species present and these species are those which are formed in sub-tropical and temperate forests, they consist chiefly of *Amentacea, Lauracea and Podocarps*, the first are chiefly oaks but there are also various kinds of *Castanea, Engelhardtia and Lithocarpus Javensis*. Amongst the second are *Tetranthera, Polyadenia, Phœbe, Machilus, Persea, Daphnidium, Litsœa and Cinnamomum*. The most remarkable individuals in the forest are the varieties of *Podocarpus*, of which one—*P. cupressina*—has coniferous leaves, whilst the others such as *P. latifolia, Junghuhniana, amara*, and *bracteata*—have broad leaves. The occurrence of two palms (*Caryota propinqua* and *urfuracea*) in this zone is remarkable; they attain a height of 60-70 feet but are not frequent. The following smaller trees are common and strike the observer at once on account of the beauty of their inflorescence, *viz.*, the various kinds of *Saurauja*; and, amongst shrubs, *Rubus, Melastoma* and *Ardisia*. Further, *Ericaceœ*, which are in the lower zone epiphytic, here

appear sometimes as independent trees, such as *Diplecosia diversifolia*, *Rhododendron*, (the former always epiphytic, the latter sometimes so in this zone) and *Vaccinium* and *Cyrtandra*. Amongst shrubs, the various kinds of *Strobilanthes* are most common: these throw up shoots 10 feet high and cover the surface of the soil often over large areas. In the upper part of this zone there also exists an immense *Lycopodium*, up to the present, unfortunately, unclassified; which, without being provided with special facilities for climbing, forms peculiar clumps or thickets on trees and bushes.

Bushy shoots of *Begonia robusta* are frequent in the upper portion of this zone, and specimens of *Astilbe speciosa* not unlike the European *Spiræa Aruncus*, are also met with. As in the moist zone, varieties of *Impatiens* are common, but in the cloud zone the inflorescence is pale rose instead of deep carmine, and this is also observable in the flowers of *Strobilanthes*. In point of fact, in this zone, the flowers are generally small, or even almost invisible, and when large, are almost invariably white, exception to this rule occurs with epiphytes. In the moist zone, on the other hand, there is much richness and variety in the colouring of the flowers. Amongst herbs one may observe many *Rubiaceæ* (*Ophiorrhiza*), *Cruciferæ* (*Pteroneuron javanense*) all with white blossoms; besides individuals of *Sanicula*, *Elatostemma*, *Pilea*, *etc.*.

The ground in the upper part of this zone above the thickets of *Strobilanthes* is generally covered with moss and ferns and often with *Rubiaceæ* and *Nertera depressa* which is cultivated in pots in Europe on account of its peculiar creeping habit and its fine red berries. The characteristics of tree growth are not similar in the moist and cloud zones; the trees not so large in the latter, and buttressed trunks have almost disappeared, the leaves are smaller; the proportion of wood and leaf has altered in favor of the former, in fact the habits of the trees do not vary much from those of broad leaved European species. At the same time, the absence of large climbers is remarkable; whilst of epiphytes, those requiring a heavy rainfall no longer exist, especially those which take root in the ground and ultimately become trees; the woody epiphytes which still find place in this zone are mostly small and often provided with water reservoirs. Thus, the taller vegetation in this zone shows the effects of a pronounced decrease in the deposited moisture, whilst the lower vegetation remains, as in the moist zone, a growth with tender leaves and superficial roots which can exist without a heavy rainfall, provided the air is laden with moisture. The most typical examples of such vegetation are those epiphytes which grow from a surface net-work of roots; and the entirely rootless *Tillandsia usneoides*.

The branches of the trees are here veritable atmospheric gardens which produce, in the lower portion of the zone, ferns,

orchids and even bushy *Ericaceæ*, but in the upper portion only mosses. The cloud zone of the Java forests might indeed be divided into two regions according to the epiphytic growth. In the upper, the luxuriance of mosses more particularly characterizes the forests.

Strobilanthes, scarcely 5 feet high, can be observed festooned with moss, even the leaves covered with a fine growth of the same; whilst from the trees over head hang flags of moss 2 feet long, so close together that it becomes impossible to see beyond a few yards, and the trunks of the trees are covered with thick layers of the same growth, which even in fine weather, stream with moisture. On these mossy coverings, epiphytes are constantly present, but only those which exist on the surface; such as *Orchids*, *Peperomia*, a few *Vaccinieæ* with their globular water cisterns, *Hymenophyllia*, and other large and small ferns. But these epiphytes as compared with the luxuriance of mosses, do not specially characterize the forests of this upper region, for their true home is in the forest at a lower elevation, where the immense *Asplenium Nidus* can be seen by hundreds, and where varieties of *Lycopodium* hang from the branches in streamers of over 6 feet long. As we ascend, the water-loving species are more and more uncommon, and we reach, finally, the Alpine regions where the vegetation is quite different.

b. The cloud zone of East Java.

The climate of East Java is much dryer than in the West, and the vegetation in the cloud zone in the East presents a much more marked type than in the same zone in the West of the island. Rain and cloud are there not sufficient to overcome the drying effect of low pressure and insolation, and in consequence the number of species decreases and also the density of the forest. The most important tree is *Casuarina Junghuhniana*, the only tree which reaches a large size in this region, and illustrates by its scanty foliage and massive bole the effect of a dry atmosphere. Other trees, such as *Quercus pruinosa*, *Albizzia montana*, *Dodonæa viscosa* are either very small or often mere shrubs. Looking up at the five pointed pyramid which rises abruptly from a plateau of 1,500 feet elevation to a height of 10,350 feet, the existence of well defined zones is at once evident. The base of the pyramid is covered either with coffee gardens or with grassy fields; then follows a belt of forest extending from 5,600 to about 9,000 feet, which shows a series of peculiar transverse markings due to the variation in species consequent on the nature of the soil, for this holds more or less moisture according to whether it lies on the ribs or gullies which seam, with great regularity, the sides of the volcano.

The former appear black and are covered with *Casuarina*; the latter brown and support a growth of *Quercus pruinosa*. The

forest belt is sharply defined both above and below. The summit of the pyramid appears of a yellow green color covered with an alpine treeless turf from which bare peaks or smoking masses of rock appear, whilst the dead craters are covered with forest growth up to their summits.

The grassy plains, at an elevation of some 4,500 feet, are due to interference, by nature or man, with the forests of the moist zone, and are not of any special interest. They are covered with various grasses and with scattered bushes of *Melastoma*, an *Albizzia* and *Parasponia parviflora*. Similar grasses and shrubs grow in the *Casuarina* forests in the lower part of this zone; whilst in the gullies various broad leaved trees are found, besides the oak already mentioned, this latter grows up to an elevation where tree vegetation finally ceases.

In the lower part of this cloud zone a few tree ferns are still found, as well as *Dodonæa montana* and *Lespedeza cytisoides* which, however, finally disappear at a still greater elevation; but the branches of the scattered *Casuarinas* are covered with thick leaved Orchids, a few small leathery ferns and lichens.

With increasing altitude the character of the *Casuarina* forests alters considerably, the trees become more numerous and higher, but yet do not form a dense forest, lichens increase in number, and a small fleshy orchid with orange and carmine flowers is noticeable. The heavy growth of grass which springs up in the lower forest no longer exists, the ground is covered with the needle-like leaves and the twigs of *Casuarina*; the vegetation peculiar to the moist zone has ceased to exist and the whole character of the forest growth approaches that of European coniferous forests. The small leaved odorous *Festuca nubigena* and *Euphorbia Rothii* (which is similar to *E. amygdaloides* of Europe) are common, bunches of dog violets, *Plantago asiatica*, white pimpernels, small *Gnaphalia* and *Pteris aquilina*, all recall European forests to us.

On the gentler slopes, vegetation becomes more vigorous and there are many bushes to be found, such as varieties of *Antennaria* (*A. saxatilis*) which sometimes attain the height of a man and the dignity of a small tree. Amongst shrubs, *Sonchus javanicus* recalls *S. arvensis* of Europe, *Valeriana javanica* reminds one of *V. officinalis* and many others are found which irresistibly carry one's thoughts back to the coniferous forests of Europe. The whole vegetation of this region points to a small rainfall with great moisture in the air; though this moisture is not nearly so great as in the corresponding zone in West Java; a fact which is fully proved by the absence here of the luxuriant growth of moss and the limited size and number of epiphytes.

(To be continued.)

Mixed Forests of Deodar and Blue Pine.

Enough has been said already on the bad effects attending the treatment of a pure Deodar Forest by heavy fellings in my note on Deodar in Kulu published in the *Indian Forester* for May 1893. I would try now to explain in the following pages what such fellings, if carried on in a mixed forest of deodar and pine, will result in.

Perhaps none of the conifers is so common in Kulu as is the *Pinus excelsa*—the five-needled pine of the Himalaya. It is not unfrequently found associated with the deodar and in some localities grows pure both above and below the Deodar forests. As an instance of a pure forest, may be mentioned the extensive forest of *Gathrang* above the deodar forest of Nachar in Bashahr, while *Kailidugh*, *Bakarkyara* and *Borsu* in Kulu proper, *Ramgurh*, *Shikarwa* and a good many other forests in Sahraj and *Shalanda* forest in Waziri Rupi may be mentioned as representing the forest below the deodar. It is with the latter kind of pure forests I propose chiefly to deal.

All such forests are comparatively young and are generally found in the proximity of large villages and towns. It is certain that all these forests once supplied the greater part of the timber required by the villagers and the townsmen for the construction and repair of their houses and shops. Consequently, every one of them was once clean or almost clean cut

In all those above named and other similarly situated forests, the blue pine grows at present almost pure with a very little sprinkling of deodar here and there.

It cannot be doubted, however, for a moment, that these localities are a little too low for kail and are better suited for deodar. It is probable, therefore, that these forests were once almost pure deodar ; but the heavy fellings have, in recent years, converted them into pine forests. The still existing terraces of the abandoned fields, now occupied by the pine, are a proof beyond doubt that a few occasional crops were taken off the areas thus cleared of the trees. A few saplings of the cedar and the pine which were too young to yield any good timber were left standing on such-terraces and in the fields. Such saplings served afterwards as seed bearers and are now distinctly visible, even from a distance, in all these forests.

Now, it is, I believe, a well known fact that *Pinus excelsa* bears seed at a very early age, and I have seen plants from ten to twelve years of age bearing cones. It seeds plentifully and almost every year. The seed is much lighter than that of the deodar and consequently is easily carried by the wind and scattered all over the place where, if the circumstances are favourable, it reproduces itself in great numbers. The young seedlings which thus spring up are remarkable for their very rapid

growth in their early age, so that wherever there is sufficient light and air they will readily develop a strong tap root capable of forcing its way into the soil where they thus fix themselves firmly before worthless species such as *Viburnum*, *Desmodium*, *Indigofera*, *Prinsepia*, *Berberis* and straggling shrubs such as roses and brambles have time to come up and occupy the areas denuded of trees by excessive fellings and consequently exposed to light and air, which conditions are, of course, equally favourable for the growth of these inferior species. Consequently wherever, in the above forests, the fields remained uncultivated for a few successive years and wherever the slopes denuded of trees had not yet been covered with worthless growth, numerous seedlings of kail sprang up. Thus the tree gradually moved on, and with it the cultivation till the whole of the area was taken up by kail.

But such a capability of springing up is not granted to deodar. It does not, moreover, bear seed before it has attained a considerable age, and the deodar saplings which escaped the ruthless hands of the villagers were too young to bear seeds. This explains at once why not a single deodar seedling came up anywhere along with those of the pine.

The occurrence of pure kail forests in the localities so well suited for the deodar may be attributed to such conditions as the above.

Now, from what has been said above, it will be understood that in a mixed forest of kail and deodar, worked for deodar, heavy fellings always favor the natural growth of kail. I am therefore of opinion that no mixed forest of deodar and pine should be heavily worked over.

In places where the young reproduction of deodar is very vigorous and the plants have firmly established themselves, every mature tree whether a deodar or a pine may be removed to give more light and air to the young seedlings. But if the young growth is scanty, the best method to work out such a forest is by improvement felling, otherwise we may convert an almost pure forest of deodar into an almost pure forest of pine

It is true that a mixed forest of deodar and blue pine heavily worked over does not suffer to such an extent as a pure forest similarly treated does, for the reason that in a mixed forest so treated whatever is a loss to the former, is a gain to the latter, while a pure forest of deodar similarly treated may sometimes altogether disappear.

Now, the pine's gain is, later on, the Deodar's gain, as well. But the question of time has to be considered, as will be seen presently. The pine always requires space and a large amount of light. No pine seedling would ever stand shade, hence the young reproduction of pine in all these pure or almost pure and well stocked forests, is quite absent.

Deodar, on the other hand, stands shade remarkably well. This quality of deodar gives it a decided advantage over its companion. Now somehow or other the deodar is sure to get itself

introduced into these forests again. Each one of these pure forests of pine will gradually be converted into a mixed forest and finally it will become one of pure deodar. But, as I have said above, such a process requires time.

I must not, at the same time, omit to mention the evil consequences resulting from the exercise of certain concessions in these forests. The manure most valued in Kulu and on which the people so much depend for the fertilization of their fields, consists of the needles of blue pine, either green or dry. The custom of lopping green branches of this pine for litter and ultimately for manure prevails mostly in *Waziri Rupi* and *Sahraj*, although it is not quite unknown in Kulu proper. The dry leaves of the pine are also collected for this purpose during the month of April, just about the time when the pine sheds its needles. Now, as has been already said, most of the forests of this pine whether pure or mixed with deodar, lie close to the villages and are, of course, daily resorted to by the people during the spring for the dead leaves. But this is exactly the time when the deodar seed begins to germinate and if it has already germinated anywhere, the seedlings are yet too young to develop a strong tap root and have hardly yet thrown off their seed cap. Consequently every deodar seedling which comes up in such forests and more especially in the places where the needles form too thick a covering for their tender tap root to pierce through to reach the soil below, is taken away with the dry leaves. It is necessary, therefore, that in order to ensure the natural or artificial reproduction of deodar in such forests, that such an injurious privilege may be stopped at least for some time after felling operations have ceased.

Another principle, however, which we must not lose sight of while treating a mixed forest of deodar and pine, is to be careful in attempts to kill the latter and other small sized trees, such as re-stock even the most ruined areas very quickly, do not allow inferior species to spring up and make the regeneration of deodar easier and cheaper.

It is, of course, very easy now to grow deodar in all these low lying and well stocked pure forests of the blue pine, but had it been tried to get rid of every pine plant in order to make room to raise the cedar at the time they had been clean, or almost clean cut, such attempts would have probably resulted in the disappearance of both these species.

Thus the more I observe, the more deeply do I feel that in order to maintain a Deodar forest, the best method to treat it, whether it is a pure or a mixed forest, is by light fellings.

KULU,
15th June, 1893.

MIAN MOTI SINGH.

The French Forest Department in Algeria.

An article entitled "A Lesson from Algeria" appeared some little time ago in the *Pioneer*. This article, which was taken from the *Revue des Eaux et Forêts* of the 25th February last and which contains a series of accusations against the Algerian Forest Department, is really an extract of a report drawn up by a Commission of which the late M. Jules Ferry was the president, appointed to examine into the question of the modifications required to be introduced into the legislation and organisation of the various services in Algeria. The writer concludes his article in the *Pioneer* after accepting the statements of general mismanagement, and attributing this state of affairs to the fact of Algeria being a sort of penal settlement and asylum of bad bargains, by endeavouring to draw a lesson from this for the benefit of our own Government, which he states allows one or more provinces in India to be recruited from the prizemen of Coopers Hill, and others to be regarded as receptacles for the inferior residuum, inasmuch as by a new and unnecessary rule every student has a choice of province in accordance with his place on the list. It is, as most Forest Officers will be aware of, no new rule that the writer refers to, but an old one which has just been abolished, old enough indeed, we think, to justify us in supposing that the writer of the article referred to might have heard something of it, had the disastrous results he anticipates resulted from it.

Our object, however, in this article, is not so much to discuss the application and fitness of the "Lesson from Algeria," but to say a few words in defence of the Forest Department in Algeria which, in this case, as is perhaps not altogether unprecedented in other countries, seems to have been made to bear more than its own share of the public indignation, when things were found to be working less smoothly than they should do.

Had the writer of the above mentioned article perused the subsequent numbers of the *Revue des Eaux et Forêts* he would have seen that a great many of the statements made in the report contained in the February number have since been contradicted, and many of the charges brought against the Department explained. For instance, as regards the enormous fines complained of as having been extorted from the people for, in many cases, petty offences, the figure quoted in the above mentioned report as the amount of fines realized in 1890 is 1,658,958 ft. whereas the financial returns for that year show a sum of 210,582 fr. as the total realized under this head. There is a sufficient difference between the two figures to nullify the effects of any arguments based on the former.

As regards the question of revenue and expenditure, it would appear that, with the exception of the cork oak forests which cover about one ninth of the total area of the State forests in Algeria, the

greater part of the forest area is not yet capable of regular working. The climate is a hot and dry one, where strict conservation is all the more necessary, if deterioration is to be prevented, and although before the French conquest, these lands belonged to the State, according to the Mussalman law it is not astonishing that they should have suffered severely from over grazing, burning and injudicious working. The results of the protection afforded them in recent years under the management of the Forest Department, can be appreciated by comparing them with the forest lands belonging to the Communes and private estates adjoining them. A private owner could not reasonably be reproached for not deriving much pecuniary benefit from a forest, made over to him immediately after its exploitation. The utility of the State Forests in Algeria is not measurable, either, by the mere amount of revenue derived from them. Another of the results of the unreasoning and rigorous conservation complained of by the writer in the *Pioneer* is the exclusion of cattle from their accustomed pasturage. As to this, grazing, if excessive before, must necessarily have been restricted; but in one department only, that of Oran, I find a statement giving 416,540 as the number of cattle, sheep, &c, grazed in the State Forests during 1890.

There is, however, one source of revenue which does not appear to have been made the most of, and that is the cork oak forests. The realization of this revenue, however, requires a previous expenditure of a considerable sum on the operation of "démasclage," or the removal of the outer layers of so-called male cork. The delay in this matter does not appear to be entirely the fault of the Forest Department, as it was only on the repeated representations of the Department, supported by the Governor General and the Algerian deputation, that in 1885 the State allotted the necessary funds for this work. In a few years, from this source alone, the forests of Algeria should be able to cover the costs of management.

The want of exactitude in determing the respective rights of the State and the residents, complained of in the report quoted in the *Pioneer*, is a matter for which the Settlement Commission appointed for this work would appear to be more justly responsible than the Forest Department. Here, as perhaps might be found to be the case in some instances in India, boundaries seem to have been laid down without previous examination of the ground, with the result that important forest areas whose preservation should have been ensured, have been excluded from the limits of the State forests, while extensive areas of cultivated and other unsuitable land have been included in these limits. Subsequent efforts appear to have been made to reclaim some of these lands, thus improperly excluded, which have not unnaturally resulted in ill-feeling against the Department into whose charge they thus passed and it is not difficult to imagine that the inclusions above

referred to, have likewise led to mutual recriminations between the Forest Department and the people concerned, especially in those cases where the lands thus included had not been properly demarcated at the time; these, in some instances, being actually occupied, and consequently the right of possession had to be respected in consideration for the people, in spite of the legal fiction declaring the land the property of the State.

The Forest Department complains of the inconsistency of its adversaries, that certain members of the "corps élus" discuss forest reforms most willingly but with a competence similar to that of a pleader discussing military manœuvres; the Algerian Press takes up the cry, enlarges on the question, and excites or amuses the public until something else occurs to occupy its attention. Thus, in 1883, nothing would suffice but that the whole of Algeria should be reafforested, to put an immediate stop to drought. In 1885 it became equally urgent to eradicate all the forest situated on the plains and lower hills, in order to encourage colonisation: and now, in 1892, a return to the ancient Arab *régime* is demanded, that the forests be turned into grazing grounds and other produce be made a secondary consideration. The prime cause of the present outcry appears, however, to lie in the resistance offered by the Forest Department to the lessees of Government Forest land acquiring proprietary right in the same. Under the old *régime*, when the forests were under the direct management of the Governor-General, considerable areas of cork oak forest were alienated, first by lease, then finally after several renewals in full proprietary right on conditions most disastrous to the State.

It is chiefly against these areas of cork-oak forest that the attacks of speculators, so called colonists and others, are directed; in 1876 a further area of some 150,000 acres of this forest was leased out for a term of years with certain provisions regarding works to be caried out by the lessees. These provisions were not fulfilled, the farmers devoting their attention to obtaining under various pretexts, renewals of their lease, in the hope that from renewal to renewal they would at last arrive by virtue of their importunity in obtaining the same proprietary right as their predecessors had done. The resistance offered to these speculators is, it is believed, one of the chief causes of the present attacks on the French Forest Service in Algeria.

We are not, of course, in a position to say how far the French Forest Department is to be held blameless for the present state of affairs; doubtless there is much to be said on both sides of the question, all we have endeavoured to do is to say a few words in its defence to set against the unqualified condemnations of it contained in the article under reference.

Note on experiments on Charcoal.

In view to furnish the Inspector General of Forests with a list of trees which are highly appreciated for charcoal burning, experiments were made in some Ranges of the South Arcot District on the charcoal yielding capacity of woods of indigenous trees. Only such woods as are generally used and appreciated by natives for charcoal making were selected. The result of the experiments will be found below.

Mode of conversion: The method adopted for converting wood into charcoal was the one generally followed by natives and it need hardly be said that it is, perhaps, the crudest and most primitive method known. The wood intended to be used is cut up into billets of convenient size and heaped up in a pit whose dimensions vary with the quantity of wood to be burnt. In the case of *thin* wood such as Kassau (*Memecylon edule*) the whole quantity, which does not exceed generally a cartload at a time, is packed in the pit and then fire is applied on all sides to the bottom layer of wood. When fire has made sufficient progress, a thick layer of green twigs and leaves is thrown over the burning mass and over it again a layer of sand or loose earth to shut out air. In the case of *thick* wood about a fourth or third of the whole quantity is first thrown into the pit and uniformly spread over the bottom. Then fire is applied and kindled with straw, dead twigs and other easily ignited stuff, and as soon as the wood catches fire and begins to burn well, the remaining quantity is thrown in and the pit allowed to remain open for 4 or 5 hours until the fire has progressed sufficiently well to ensure the burning of the whole. Then it is covered over with green twigs, leaves and earth as above noted. From time to time a pointed stick is run through the covering to ascertain whether carbonization of the wood is going on satisfactorily. If smoke and vapour come out in large quantities from the surface of the covering or through the openings made by the stick, more earth is thrown over to shut out the air. If, on the other hand, no smoke and vapour escapes through the holes or if the quantity thus escaping is so slight as to indicate that fire is going out, more air is let in by making as many openings in the covering layers as necessary. Thin wood is found to require about 40 to 50 hours to carbonize. Thick wood takes a much longer time, varying from 3 to 6 days, according to the size of the billets used; after the whole is quite cool, the pit is opened and the charcoal taken out. Four tons of wood were converted into charcoal in my Range, and in every case it was found that a large proportion of the wood, varying from $\frac{1}{6}$ to $\frac{1}{4}$ of the total quantity put into the pit, was left unburnt, of course the unburnt wood was again thrown into the pit and carbonized.

STATEMENT No I.

Detailed results of experiments.

Forest Range.	Species of wood used.	Quantity of wood used.	Quantity of yield of charcoal	Yield of charcoal per ton of wood.	Percentage of yield.	Cost of the whole operation calculated per ton of wood burnt.			Remarks.
		lbs.	lbs.	lbs.					
Tindivanam ...	Kassau ...	2240	498	498	22 24	2	0	0	
Virdachallam ...	do. ...	336	64	426⅔	19·01	3	5	4	
	Average ...	.	...	462⅓	20·62	2	10	8	(1)
Tindivanam ..	Karungali (Acacia suudra) ...	2240	537	537	23 98	2	0	0	
Kallakurchi ...	do. .	2240	373	373	16 64	not given			
	...	...	...	455	20·31	...	...	...	(2)
Tindivanam ...	Tamarind (Tamarindus indica) ...	2240	470	470	21·00	2	5	6	(3)
Tindivanam ...	Turinji (Albizzia amara) ...	2240	510	510	22·77	2	5	6	
Virdachallam ..	do. .	420	66	352	15·21	3	5	4	
Tirukoilur ..	do. ..	2240	466	466	20·80	not given			
Kallakurchi ...	do. ...	2240	361	361	16·11	do.	do.	do.	
	...	..		421¼	18·72	2	13	5	(4)
Virdachallam ...	Karuvelam (Acacia arabica) ...	2240	387	387	17·27	3	2	0	
Kallakurchi ...	do. ...	2240	339	339	15·13	not given			
	..	...		363	16·20	...	...	..	(5)
Tirukoilur ...	Velvelam (Acacia leucophlœa) ...	2240	392	392	17·50	not given			(6)

Statement No. II.

Comparative average outturn of charcoal per ton of wood different kinds given in the order of highest yield.

Species of wood.	Yield of charcoal per ton of wood.	Percentage of yield.	Cost of the whole operation calculated per ton of wood burnt.			Remarks.
			Rs.	A.	P	
Tamarind	470	21 00	2	5	6	
Kassau	462⅓	20 62	2	10	8	
Karungali	455	20·31	2	0	0	
Turinji	421¼	18 72	2	13	5	
Velvelam	392	17·50	not given			
Karuvelam	363	16 20	3	2	0	

A comparision of the results of the experiments made in different Ranges on one and the same kind of wood show great variation in the yield of charcoal, as will be seen in statement No 1. I am inclined to believe that this is due to mistakes made in weighing the wood and charcoal, or to omission to return unburnt remains of wood. Whatever cause it may be due to, this result cannot be taken to represent the standard yield of charcoal by the different woods dealt with ; but it may be assumed that it gives a fairly approximate idea of the charcoal yielding capacity of each species when carbonized in the local primitive fashion.

From what statement No. II shows, it may be roughly stated, making ample allowance for mistakes made in conducting the experiments, that each of the woods dealt with yields about one fifth of its weight of charcoal when manufactured in the local native method. Judging from the above one fifth results and the value of green Kiln wood in this District, it may be safely observed that charcoal burning is financially a loss here

Charcoal making in European fashion would doubtless yield much better and more satisfactory results, and it would be really worth while and interesting to experiment on a larger and more extensive scale.

It would be interesting and instructive to study the results of experiments made in different parts of India on the subject both on the European and Native methods. I learn that charcoal is manufactured on a pretty large scale in North Arcot District in the European fashion ; if so, I hope an account of it will be published in the *Indian Forester* by some one who has a personal knowledge of it.

M. R.

GINGEE,
3rd February, 1894,

II.-CORRESPONDENCE.

Iron-making in South India.

DEAR SIR,

I enclose herewith a cutting from the *Madras Times* and I believe it would be desirable to reprint the article in the *Indian Forester*.

The writer claims for the Martin-Thomas process that it can work iron on a small scale and yet by a perfect method.

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This has been the aim all along. The Martin-Thomas furnaces on a small scale worked imperfectly with great waste of ore and fuel, and the perfect European methods were too costly and required too much fuel at one site.

I know the gas furnaces well and saw them used in Switzerland three years ago, but only for scrap iron, not for ore. I am now informed that within the last four years the ore has been *directly* transformed into mild steel by means of the gas furnaces. The temperature which these furnaces give, when the air of combustion and the gas have both been heated in brick chambers by the waste heat, is very high ; and provided that the reduction of the rich ore is successful, I can quite believe that a direct process of steel making is possible. My informant says it is and has been done, but he has not seen it done in his own presence. Now, if you would, for the present, republish this article, it might then be possible to obtain more substantial information about this direct method of steel making. Perhaps the best way of getting this information is by reading up the last few years' numbers of some periodical on Iron and Steel making. It is impossible that a new method should be successfully practised since four years without anything being reported about it in the respective professional papers. But I have no access to such papers now, as my work is in the Jungle.

H. WARTH.

Attention has been directed to the iron ores of Southern India, and it is possible that English capitalists may ere long attempt something in the way of exploiting the immense supplies of excellent ore that are present, almost everywhere in the Southern Peninsula of India. At the risk of appearing tedious, we again invite attention to the Martin-Thomas process, as being well within the reach of small capitalists, and as being the method most peculiarly adapted fer the reduction of iron minerals in a country where fuel is scarce. It will be well to give some explanation of the process and explain why it is especially adapted to India. It is this : the process does not employ any direct fuel with the ore, the fuel used is used for the production of gas, and the gas produced is not taken directly and entirely from the fuel, but is mainly derived from the atmosphere and the vapour of water. These two elements exist everywhere, and by the Martin-Thomas process and by the aid of a comparatively small amount of fuel a gas known to the French as "gaz pauvre," or "poor gas," is produced. It is called "poor" as it is not fit for lighting purposes as coal gas is, in that it contains but little oxygen. It is produced by passing steam at a low temperature over a bed of fuel that is glowing red hot. The arrangement of the Martin-Thomas furnace derives the needful steam from a pool of water that is below the grate, and the steam is made by the heat of the fire on the hearth, and by red hot cinders, &c., falling into the pool through the bars of the grate. This steam passing over the glowing surface of the

fuel is decomposed in combination with the heated atmosphere into a gas, the components of which are hydrogen, carbonic oxide, and nitrogen gases. This is the "gaz pauvre" of the Martin-Thomas system. This gas, leaving the furnace which has not to be heated to anything like the temperature that is needful to reduce iron ore direct, passes into a further reservoir, from which it is again directed into the cupola or receptacle in which the ore for reduction is placed. The caloric engendered by this gas is calculated to be equal to 4,000° Fahrenheit, while the heat needful to melt iron is only 1,996°. It is a question of the consumption of fuel. In the old furnace process to get a temperature of 1,996°, fuel has to be consumed, of which only a small portion arrives at that temperature, and the waste is enormous With the Martin-Thomas process the temperature of the gas-making furnace may be very low, some 800° only, and this is the only fuel that is expended ; it is expended, as we said before, in making gas, and the main components of this gas are drawn from the air and water, and these are obtained gratis.

It only requires a little consideration to perceive the enormous advantage of this system in a country where fuel is scarce and bad, as any fuel will do to heat up the hearth. The results in gas-making are the same, whether coal or even sawdust are used, the only difference being that the hearth has to be made larger in proportion to the quality of fuel employed, that is to say, the poorer the fuel, the larger the hearth. There is no doubt that the needful gas could even be made with the aid of the country fuel known as bratties. The above is a rough explanation of the system. The peculiar adaptability of the process to Southern India consists in the fact that it need not be worked on a large scale. All attempts to make iron in Southern India have hitherto been on a large scale, and as the only available fuel in South India is wood, and that wood not very plentiful, it is obvious that a small installation, say of two tons, such as is ordinarily used in Sweden, placed in the proximity of the iron mine and at no great distance from a moderate supply of fuel would succeed where a large installation of the old type is bound to fail in consequence of the enormous area over which fuel has to be bought. The enormous amount of fuel required, the expense of burning the wood into charcoal, and the loss of valuable gases in the process, this last amounting to about 75 per cent., as four tons of wood will give only one ton of charcoal, the gases and the caloric that was contained in the wood would, if burned upon a Martin-Thomas hearth, instead of being wasted in a charcoal retort, have given 3 or 400 per cent. caloric on the hearth, and produced a gas whose co-efficient of caloric is 4,000°, and finally the haulage of charcoal from over an extended area to the iron works.

All these expenses are avoided by the small works we advocate, and they are specially within the reach of small capitalists.

A two-ton furnace could be set up for £4,000 and worked certainly 300 days in the year, and an area of 2,000 acres of casuarina would serve to keep it continually going. Small furnaces of this type dotted over the Salem or other districts where good ore is to be found, would probably succeed and it would perhaps even be profitable to erect one in Madras, where fuel is cheap and abundant, and transport the ore to the furnace. This, however, is a question of detail that anyone interested can easily work out for himself by comparing the cost of transport of the ore with the gain in price of fuel. Many writers are engaged upon the subject of Indian iron at present, and have various views, but we are firmly convinced that the above is the only process that has as yet been invented, which can be utilised successfully in Southern India. It is certainly worth more serious attention than it has as yet obtained, and this must be taken for our excuse in reverting to the subject: *gutta cavat lapidem.* We trust that by constant reiteration someone may be induced to try it.—*Madras Times.*

III.—OFFICIAL CORRESPONDENCE.

Review of Forest Administration in British India for 1891-92.

As last year, the late appearance of this Review makes it in advisable to do more than give a certain number of extracts. We have reviewed all the Reports separately and done our best to place before our readers the most interesting matters in each; and we should have liked to have finished up by recording the most important parts of the Inspector-General's very interesting summary before our 19th Volume came to an end. But it could not be helped, and while the results of 1892-93 are already under discussion, we must ask our readers to carry their thoughts back to a year that is now long past. A correspondent recently asked us to publish statistics of the area and finances of the Department. We wish we could give him the figures for January 1st 1894, but unfortunately, they are not available: we will, however quote such of these given by Mr. Ribbentrop as are likely to interest him and hope that he will forgive us if we have to carry him back to April 1st, 1892.

In Chapter I.—Section I, the *area* of the Forests under the control of the Department on that date is discussed and the figures are given in the following table. It will be noticed that Leased Forests, of which there are 836 square miles, are included.

Province.		Forest area in square miles.				Percentage of Forests to whole area of Province.	Percentage of Reserves to whole area of Province.	Remarks
Name.	Area, in square miles.	Reserved.	Protected.	Unclassed State.	Total.			
Bengal ...	150,717	5,211	2,181	4,534	11,926	8	3	(*a*) Includes 78 square miles of *Leased* Forests.
North-Western Provinces and Oudh ...	107,441	(*a*) 3,768	94	54	3,916	4	3½	(*b*) Includes 343 square miles of *Leased* Forests
Punjab ...	106,613	(*b*) 1,715	481	(c) 3,871	6,070	6	1½	(*c*) Includes 224 square miles of *Leased* Forests.
Central Provinces ..	86,501	19,680	...	393	20,073	23	22½	(*d*) Includes 461 square miles of *Taungya* areas.
Burma (Lower) ...	87,220	(*d*) 5,615	..	...	(*d*) 5,615	6½	6½	(*e*) Includes 113 square miles of *Taungya* areas.
Burma (Upper) ...	77,296	(*e*) 1,059	(*f*) 16,461	...	17,520	22	1	(*f*) Exclusive of the area of India-rubber forest of which it is impossible to form any estimate.
Assam ...	45,350	3,612	912	5,435	9,959	22	8	(*g*) Baluchistan left out of account.
Coorg ...	1,583	113	742	...	855	54	7	(*h*) Exclusive of the areas of Feudatory and Tributary States, Zemindaris and whole Inam villages.
Ajmere ..	2,711	139	...	* 8	147	5	5	(*i*) Includes 99 square miles of *Leased* Forests.
Baluchistan ..	...	82	...	..	82	...	...	(*j*) Includes 92 square miles of *Leased* Forests.
Andamans ..	1.989	...	...	1,957	1,957	98	..	* Village lands managed by the Department, but not yet brought under the Ajmere Forest Regulation.
Total ...	667,421	40,994	20,871	16,255	78,120	(*g*) 12	6	**The area of 'District Reserves."
Berar ...	17,711	1,256	**1,005	2,175	4,436	25	7	
Total Bengal Presidency ...	685,132	42,250	21,876	18,430	82,556	(*g*) 12	6	
Madras ...	(*h*) 84,880	(*i*) 7,175	(*j*) 9,404	1,304	17,883	21	8	
Bombay ...	124,352	10,318	4,209	.	14,527	11½	8	
GRAND TOTAL ...	894,364	59,743	35,489	19,734	114,966	(*g*) 13	7	

But these 115,000 square miles under the control of the Department do not represent the whole area of forest land in possession of the State; and on the management of these further areas the Reviews says :—

"I have already pointed out in previous reviews that the 'gross extent of forest managed by the Department does not com-'prise the whole area of forest lands in possession of the State. 'In many instances, these lands, which are at present still outside 'the sphere of the Department, are clad with tree-forest ; in others 'they are grazing-grounds with hardly a bush on them ; and 'between these two extremes every variety is represented. It is, 'in my opinion, desirable that some of them should be brought 'under conservative forest treatment, either because they are or 'will be valuable on account of the forest-produce they are able to 'yield, or, with special reference to forests occupying hill slopes, 'for the protection of underlying cultivated lands. Some tracts, 'however, should doubtless be used primarily as grazing-grounds, 'and the tree-growth on them is of little or no importance : others 'again are either by nature intended for permanent cultivation or 'can be adapted thereto by irrigation works. Such lands must 'ultimately serve the purpose for which they are best fitted. It 'is obviously desirable, however, whatever may be the character 'of such lands and the natural growth thereon, and whatever the 'purpose which they are intended to serve, that the power of 'Government to interfere with their management should be finally 'settled, and, where this has not been efficiently secured, it can 'best be done under the Forest Law."

Section II deals with the very important question of 'Forest Settlements' and once more endeavours to explain, for the benefit of incredulous Governments, that a careful adherence to the legal arrangements provided in the various Acts and Regulations does not restrict the freedom of action of those Governments in respect to the future treatment of the area settled, or prevent them from granting concessions, or even rights, where they consider it desirable to do so. And in order to have the legal rights admitted at Settlement, the granted rights, the concessions or privileges and the standing orders to be fully recorded, the Inspector-General proposes to classify the entries in the records of each Forest under the following heads.

(1) Legal rights admitted under the forest settlement, with the necessary remarks regarding their limitation, commutation and extinction, as the case may be

(2) Rights granted by Government under section 22 of the Indian Forest Act, or corresponding sections of other forest laws, with the necessary particulars as regards duration, limitation and conditions.

(3) Temporary concessions, changeable or terminable at the will of Government, granted under rules made by the Local Government.

(4) Standing orders to the Forest Department to permit certain specific acts.

Section III on *Demarcation* gives an account of the work of the year in different provinces which is said to be satisfactory.

Section IV on *Surveys* records that 3,353 miles were topographically surveyed during the year, chiefly in the Central Provinces, Madras, Burma, Bengal and Assam at a cost of Rs. 355,000, which is rather more than 100 Rs. per square mile.

Section V on *Working Plans* contains some important remarks on the mistake made in attempting to make these Plans in too elaborate a manner. Mr Ribbentrop says :—

" It is, in my opinion, of infinitely greater importance that ex-
' tensive areas should be brought under some systematic treatment,
' with the object of securing their general inprovement, than that
' we should try to force selected working-circles into the straight
' jacket of elaborate working-plans. In certain cases, where the
' crops are specially valuable and where difficult sylvicultural pro-
' blems are to be solved in order to meet a specially large demand
' on the resources of a forest area, elaborate plans are excusable and
' even advisable ; but, in most cases, we ought to leave elaboration
' to future generations of forest officers and aim at bringing the
' bulk of the forests under a simple systematic and conservative
' management."

And we are very glad to read his remarks, for apart from the difficulty in preparation, there is the still greater difficulty to be faced of the carrying out. Until we have a complete staff of Range Officers, fully trained to observe and understand sylvicultural phenomena, it will be a great mistake to give them prescriptions of too elaborate a character to work. The proper application of the ' uniform method' would, in our opinion, be almost an impossibility until Range areas have been much reduced and competent observers have been trained, capable of exercising independant judgment in questions of reproduction

Section VI on *Communications and Buildings* very properly draws attention to the advantage which the North-Western Provinces and Oudh have derived from the marked lead they have always taken taken in the construction and improvement of roads, and urges on other Provinces the importance of the subject " not merely in the interests of the State, as the proprietor, but in that of the consumers as well."

In Chapter II on *Protection and Improvement*, Section 1. gives an account of the number of breaches of the Forest Law during the year which came to :—

	Taken into Court.	*Compounded.*	*Proportion of convictions.*
Bengal Presidency ...	2,924	12,714	82
Madras ,, ...	8,124	3,512	75
Bombay ,, ...	1,696	16,091	78
Total	12,744	32,317	79

The Review remarks that "the majority of forest cases are 'of a trivial character when considered individually, but they 'become dangerous and sometimes destructive by their frequency"; and while advising leniency in such matters as petty thefts of dry wood, fruits, etc., whose removal does not materially affect the physical prospects of the forests, recommends strictness in dealing with such offences as illicit grazing, the destruction of young growth, the removal of humus and the like, matters which endanger the well-being of the forest estate.

Section II on *Fire Protection*, shews that of 27,938 square miles attempted, 24,046 square miles or 86 per cent were effectively protected at an average cost of 3 pies per acre.

In Section V on *Thinnings and Improvement Cuttings*, there are some interesting remarks on the necessity for operations of this character in order to remedy the bad condition of the crop in most Indian forests due to previous bad treatment. The Review points out that the judicious use of the axe is, if accompanied by a thorough protection of the forest under treatment, of greater importance than sowing or planting. This is very true, and especially so when it is considered how unsatisfactory, on the whole, have been the results of desultory works of artificial reproduction in the Indian plains. All the same, we would certainly advocate the judicious use of planting works in order to fill up blanks or to introduce the valuable kinds in places where seed givers are wanting, and the growth has been reduced to too large a proportion of the less valuable species.

Chapter III deals of the '*Working and Outturn*' and shews that the outturn of the year in timber and fuel come to 166,596,010 cubic feet in all or, taking 114,966 square miles as the total area, 1,449 cubic feet per square mile. The best outturn from Reserved Forests was in Bengal, where it amounted to 3,294 cubic feet, chiefly, we presume, from the Sundarbans.

Chapter IV gives the '*Financial Results*' of the year and shews that in 1891-92, the *gross* revenue was Rs 154,17,010 and the *net* revenue Rs. 56,21,315, the gross revenue being distributed thus :—

(*a*)	Wood	112,46,538
(*b*)	Minor Forest Produce ...	15,35,065
(*c*)	Grazing	19,56,506
(*d*)	Revenue from forests not managed by Government	2,84 393
(*e*)	Miscellaneous	3,94,508
	Total ...	154,17,010

The figures for the Provinces were.

Province.	Revenue.	Surplus.	Deficit.	Proportion of Surplus to Gross Revenue.	Net Revenue per square per mile of land under control of Forest Department.
	Rs.	Rs.	Rs.	Per cent.	Rs.
Imperial ...	6,688	..	59,100	...	...
Bengal .	7,89,553	3,66,623	...	46	31
North Western Provinces and Oudh ...	17,31,514	7,73,303	...	45	197
Punjab ...	10,20,074	3,79,799	..	37	62
Central Provinces ...	13,59,900	5,55,985	...	41	28
Burma (Lower) ..	28,58,114	15,32,993	...	53	273
Burma (Upper) ...	13,27,300	9,53,441	...	72	54
Assam ...	3.36,129	68,604	...	22	7
Coorg ...	1,82,897	96,017	..	53	112
Ajmere ...	19,799	5,813	...	29	39
Baluchistan ...	20,609	.	9,888	...	...
Andamans ..	2,72,338	92,42	..	34	47
Forest School ..	1,788	..	42,559	...	..
Forest Surveys (Imperial ...	257	..	26,625	...	...
TOTAL ...	99,26,960	47,86,855	...	48	61
Berar ...	5,11,185	3,12,819	...	61	71
Forest Surveys (Berar).	...	...	...	...	...
Total Bengal Presidency ...	1,04,38,145	50,99.674	...	50	62
Madras ...	16,94,216	3,69 962	...	22	21
Bombay ...	32,84,649	13,53,192	...	41	93
GRAND TOTAL ...	1,54,17,010	67,22,828	...	44	58

The Inspector-General then proceeds to give the comparative revenue and expenditure of the last twenty years in periods of four years and the table is an interesting one for it shews a gradual decrease in the percentage of expenditure to gross revenue.

Quinquennial periods.	Gross Revenue.	Expenditure.	Percentage of Expenditure to Gross Revenue.
	Rs.	Rs.	
1866-67 to 1870-71 ...	42,13,000	29,94,000	71·06
1871-72 to 1875-76 ...	63,21,000	42,19,000	66·74
1876-77 to 1880-81 ...	68,59,000	47,29,000	68·94
1881-82 to 1885-86 ...	1,02,04,000	64,96,000	63·66
1886-87 to 1890-91 ...	1,34,43,000	78,22,000	58·18

He adds "this is not entirely a matter for congratulation, as 'it tends to show that the State does not now spend sufficient of 'the annual revenue on the maintenance and enhancement of its 'forest capital."

We hope that the results will be that our Government will take steps to remedy matters, and devote larger sums to sylvicultural works of improvement, the opening out of communications and the development of minor forest industries so as to utilize the less valuable products. In some provinces, a considerable sacrifice will have to be made in introducing economy in the use of forest material and in forest grazing, for we know of some localities in which the amounts which at present are demanded from them are greater than they can give permanently: in other words, the interest is being paid out of capital.

From Chapter V. *Establishments* we extract the following:—

"The reorganization of the Upper Controlling staff provides '(apart from Upper Burma, where the reorganization has not as 'yet been completed, and excepting any new forest areas which 'in other provinces may be brought under the management in the 'Forest Department) sufficiently for the control the Department 'has to exercise. Even at the time of writing, however, 19 'vacancies exist, which to a considerable extent accounts for the 'complaints of Local Governments that the superior staff is under-'manned. The most serious question, as regards forest adminis-'tration, which has occupied the Government of India for some 'years, is the reorganization of the staff of rangers and of other 'subordinates. The importance of the reorganization of these 'establishments has been urged on the Government of India by all 'Local Governments, and has been fully recognized by the 'Imperial Government, but the sanction of the Secretary of State 'has not been obtained."

If the sanction to the improved staff is not soon received, we may look to a falling off in work and less favourable financial results. Further on, attention is drawn to the effect of this withholding of sanction on the welfare of the Imperial Forest School, for so long as no organized prospects of sufficient attraction are offered, suitable men will not come forward to study at the School and enter from it the ranks of the Department.

Tasar Silk production in the Central Provinces.

The production of tasar silk in the Central Provinces will, it is hoped, be substantially promoted by the following order issued in 1892 by the Chief Commissioner. The representations which led to the issue of these orders were supported by the result of detailed enquiries showing that the pollarding of saj (*Terminalia tomentosa*) trees required for tasar cultivation could be worked, and indeed was worked, on a proper rotation, and that the growth of the worms could be carried on year after year on limited plots or *baris*, without causing any destruction to the forests at large.

RESOLUTION.

The Commissioner of Settle nents and Agricultture has represented that the production of tasar silk in these Provinces is declining, notwithstanding the issue of orders by this Administration for its encouragement in accordance with the desire of the Government of India that the production of silks indigenous to India might be promoted. The principal reason assigned by the Commissioner of Settlements and Agriculture for the decay of the industry is that the cultivation of tasar worms has been discouraged in Government Forests; and Mr. Fuller invites attention to the fact that the orders issued in Book Circular No. VI of 1883, which while prohibiting the pollarding of saj trees in Government forests where they were grown for timber, authorised the selection of tasar silk rearing grounds in tracts from which no useful timber could be expected, have had the effect of stopping the growth of tasar altogether within forest limits. It is stated that inasmuch as the industry brought in no income to Government, it has been regarded as injurious to forest interests, while the policy of the Forest Department has influenced the action of Government Officers in Court of Wards Estates, and has also had some effect on malguzars, who have latterly given fewer facilities to the tasar rearers than they used to do.

2. The proposals which Mr. Fuller makes with a view to improving the tasar industry may be stated as follows:—

(1) that in second class forests the leasing out of suitable areas to Dhimars for tasar cultivation should be accepted as one of the regular incidents of forest management;

(2) that the areas within which tasar cultivation should be permitted should be determined by the Forest Department in communication with the Agricultural Department, and it should be made known to the people that cases for tasar *baris* or farms will be given within these areas;

(3) that the levy of a small acreage rate of one or two annas an acre might be prescribed;

(4) that a similar policy should be followed in Court of Wards Estates, which contain forests suitable for tasar cultivation, in localties where tasar is produced.

3. The Commissioners of Divisions and the Conservators of Forests, who have been consulted on these varions points are generally of opinion that the rearing of the tasar silk-worm has greatly declined of late years, and that it has entirely ceased in Government forests. They consider that the industry will thrive if facilities are afforded to the people in Government forests, and concur in the suggestion to allot suitable areas for the purpose.

The measures which are proposed commend themselves to the Chief Commissioner as reasonable, and he desires that the selection of suitable areas may be taken up without delay by the Forest Boundary Committee, consisting of each Conservator within his own circle and the Commissioner of Settlements and Agriculture as representing the Agricultural Department.

4. The decision as to the districts in which such action is both feasible and desirable must apparently depend upon climatic considerations, and the existence of a sufficient number of Dhimars, who are, with few exceptions, the only people that practise the industry. The districts which may be regarded as the home of the tasar worm are situated in the southern and eastern parts of these provinces, *viz*,, Chanda, Bilaspur, Sambalpur and in a minor degree Balaghat, Seoni and Bhandara. Apparently there are plenty of Government forests in Chanda which could be utilized for the purpose, and in Sambalpur, though the area of Government forest is small, some 5,000 acres could, it is reported, be set apart for the purpose, while certain areas are also available in Bilaspur, Bhandara, Chhindwara, Seoni, and Balaghat. In the last-named district, the Conservator, Southern Circle, apprehends that the available areas may prove too damp and cold, but this is a matter which practical experience can alone determine.

In the Northern Circle, the industry is reported to be practically unimportant, and frost, hail and cold, are said to militate against the propagation of the tasar of commerce which is the product of the cold weather crop. The Conservator reports that, if Dhimars can be found to undertake cultivation in Mandla, Betul, Hoshangabad and Nimar, a sufficient area of saj forest might be made available. It may be doubted whether the Dhimars will undertake the experiment ; still the Chief Commissioner considers it desirable that suitable areas of saj forest in these districts should likewise be assigned for the purpose, so that, at all events, the Administration may be freed from the reproach of destroying the industry by its forest system.

In the remaining districts, little or no cultivation appears to have been carried on at any time, and as the Dhimars are very few, no action in this direction seems called for.

5. The most convenient area for the *baris* would, in the Chief Commissioner's opinion, be about 20 acres, and this should be divided into four compartments of 5 acres each, only one of which will be under tasar in any one year. The Chief Commissioner considers that it would be advisable to charge a rent for these *baris*, as proposed by the Commissioner of Settlements and Agriculture. As at present advised, he would fix the rate at four annas per acre per annum for the land actually under crop, nothing being charged for the fallow land Or, if the people preferred it and it suited better, one anna per acre per annum might be charged for the whole *baris* of 20 acres, fallow included.

6. Apart from the action to be taken in Government forests, as indicated in paragraphs 3 and 4, the Chief Commissioner desires that early steps should be taken in the same direction in those Court of Wards Estates where there is any hope of success, *e. g.*, Phuljar and Borasambar of the Sambalpur District.

The selection of the sites for *baris* in these estates will rest with Deputy Commissioners, acting under the control and guidance of the Commissioner of the Division

7. In conclusion, the attention of the Forest Department is invited to the proposal made by Khan Sahib Mahomed Ghouse, Forest Divisional Officer, Balaghat, that tasar *baris* should be given free of charge to Dhimars who agree to settle in Forest villages and to work for the Forest Department at the usual rate of wages during the time their services are not required in connection with tasar cultivation. This plan, if feasible, might solve, in certain localities the problem of obtaining local labour which so often gives trouble to Forest Officers, and impedes work.
—*Agricultural Ledger Series.*

IV.—REVIEWS.

Agriculture in Cuttack.

We have received a copy of an important and valuable Report by Mr. N. N. Banerjei on the agriculture of the District of Cuttack in Orissa, which must have almost exhausted the subject of the condition of the delta District of the Mahanadi.

We have examined it with great interest, and congratulate Mr Banerjei on having done such a useful and complete piece of work. Our readers will hardly care to hear much of it, however, except from the special point of view of the Forest Department. So far, there are no reserved forests in Cuttack and we are not quite sure that there are any waste lands, the property of Government, that could be reserved. But there are considerable areas of forest here and there and notably there are the delta forests on the coast, the property, we believe, chiefly, of the Maharajah of Burdwan. There must also be a good deal of forest in the Sukinda estate; and in his discussion of the question of 'Fuel supply' at page 121, the author says that that supply comes from "the jungles 'of Dompara, Harispur, Kanika, Kujang, Sukinda, Madhupur, 'Patia and other petty forest tracts" which aggregate about 513½ square miles. Mr. Banerjei quotes the price of firewood in 1873 at 200 seers per rupee, while in 1890-91 it was only 80 seers; but all the same, he does not think that it is so much the fuel that is scarce, but that the difficulties of obtaining it have increased, chiefly through the tendency to increase cultivation at the expense of the jungles. He also remarks on the scarcity of fodder, and his suggestions for improvement, which we give *in extenso* herewith, will be read with interest, especially as they seem to us to agree with the recommendations of Dr. Voelcker.

"*Suggestions for improvement.*—In the way of improving 'the fodder-supply, I may here urge the necessity of reserving 'grazing grounds. During the settlement now in progress, large 'tracts may be set aside for fodder and pasture reserves, so that 'the evil which has converted grazing into arable land may not 'continue as it must inevitably do otherwise. It should now be 'seen that no undue proportion of waste land be brought under 'cultivation. The Government may acquire such uncultivated 'lands and reserve them, and gradually convert thorny brushwood 'or bare rock and stone into tracts covered with vegetation edible 'by cattle. Under systematic artificial care and treatment there 'seems no reason why the ultimate financial results should not 'more than cover the initial expenses that would have to be in-'curred in acquiring and protecting the lands. There is a tendency 'among zimindars, natural under the economic conditions that hold 'at present, to have all their waste lands brought under cultivation. 'They offer favourable terms to induce ryots to break up the 'jungle and bring jungle land under the plough. Laudable as 'such efforts are on the part of the zimindar, in the face of the 'fodder scarcity which is making itself felt more day by day, it 'seems desirable that they should rather turn their energies to 'improving these forest lands by cutting down useless brushwood 'and planting in their place useful trees, such as the sissu or teak, 'which, in the course of ten or fifteen years, would supply wood

'which would not only serve as valuable fuel, but be available also 'for building purposes, or, what comes more under this chapter, 'by doing away with the jungles altogether, no doubt at some 'expense to themselves, and converting them into extensive pasture 'grounds."

With these recommendations, generally, we also agree, but we cannot help protesting, as we protested when we read Dr. Voelcker's Report, against the fallacy of imagaining that the same area will produce both *pasture* and *improved forest growth.* The holder of a deposit account at a bank might just as easily expect to be able both to gradually withdraw his deposits and to obtain a permanent fixed income from the original capital. No one who knows the conditions of forest grazing in this country, will be so bold as to think that in a District where pasture is admittedly scarce, forest tracts can be improved or created, while at the same time they are over-run by cattle By all means, let the Government acquire forest and waste lands ; in our opinion they ought to do so even in permanently settled Districts and still more so in Districts like Cuttack, which are liable to famine. But having done so, it will be better policy to make a sharp division and separate off and close to pasture those areas which are to produce supplies of wood and timber, while managing as pasture grounds such others as may be available, without expecting to see them produce a wood supply as well. No one who has ever seen the waste lands in Puri, the District adjoining Cuttack, can possibly imagine that any thing short of complete protection against cattle, and especially goats, can restore them to a condition of capability of supplying even small fuel, much less timber of any kind. However, it is something to find that Mr. Banerjei goes as far as he does ; for twenty years ago a native official who held such views as he has put forward, would indeed have been a rarity. We are not very sanguine that Government will accept his suggestions and carry out the proposal of acquiring waste lands to be managed partly as permanent pasture grounds, partly as closed forests for the supply of fodder grass and fuel, but it is the right thing to do, and Bengal is probably the Government which is most likely to start the work, if any do. The notion about planting looks well on paper, but it is not so easy in practice : for there are few things so difficult in India as to rear plantations on poor over-grazed land.

Chapter IX of the Report gives a list of 40 timber trees which will be useful locally, but we should hardly have called the wood of *Terminalia Belerica* white, that of *Diospyros Melanoxylon* dark red, or that of *Kydia calycina* brownish. There are also lists of food plants, fruit trees, dye plants, trees yielding oils and gums and fibres and a long and exhaustive catalogue of medicinal plants. In the final suggestions, the planting of date and areca nut palms is strongly recommended.

Annual Progress Report of State Forest Administration in New. South Wales for 1892.

The report for 1891 was reviewed in our number for April last. The one before as is very much shorter, the result of orders issued to all Departments of the Colony to condense Reports and economize cost. It is thus rather easier to review.

The area of the Reserves has increased since last year to 5,694,034 acres or 8897 square miles, an increase of 146 square miles over the area last year, which we regret to have given as 7,815 square miles instead of 8,751 (see p. 148), and this in spite of a considerable reduction owing to the cancelment of 18 reserves and other excisions. It would seem that even some valuable areas are being cancelled, for the Under Secretary for Mines and Agriculture says :—

"The area of land reserved for forest purposes was reduced 'last year by about 88,000 acres, and I am inclined to think the 'area might with advantage be still further reduced. To this end 'steps are now being taken to ascertain to what extent the several 'reserves can be further curtailed without detracting from their 'value for the purposes of timber supply."

"It is much to be regretted that the Don Dorrigo Reserve 'should be cancelled for the purpose of selling the land, as about 23,000 acres cedar seedlings and rootcuttings were transplanted 'in this reserve, and seed beds were made. Since then, the trees 'have been thinned and the undergrowth cleared away. These 'works were commenced in 1884, and the total expenditure thereon 'amounts to £3,025, and the reserve is, I understand, specially 'adapted to the growth of cedar. In the event of land within the 'reserve being sold, care will, I am informed, be taken not to sell 'any portion that has been improved."

' The Financial results of the year were as follows :—

Revenue	£16,176
Expenditure	£24,635
Deficit	£8,459

—but it is explained that a considerable increase has taken place in the value of capital stock and that since the Department was organized in 1877 the general credit balance in its favour amounts to £155,281. We do not quite understand these figures, any more than we quite understand how 'trees planted' and 'trees thinned' are placed in the same category. The Report says 'of the trees planted and thinued something like 95 per cent have survived and are doing well" and we should like to have this explained to us.

As usual with Colonial forest work more stress seems to be laid on the work of planting new trees, than on the management of the natural forests. An area of nearly 9,000 sq. miles (less than-3 per

cent of the area of the Colony which is 310,700 square miles) of presumably natural forests of more or less value, ought to provide scope for some very interesting work in forest management; but the energies of the staff seem to be principally devoted to the plantations which are extensive and evidently good and to the rearing of large stocks of nursery plants. The chief nursery is that of Gosford, where there was a supply of 686,583 plants of all kinds, trees, shrubs, climbers, large grasses and even ornamental pot plants. The chief tree grown is the '*Pinus insignis*' and after it come the Sugar gum (*Eucalyptus corynocalyx*) the olive, English oak, cluster pine and white cedar (*Melia composita*). A considerable proportion of the trees reared (130,000) were distributed to Schools and corporate bodies for the 'Arbor day', a useful institution which was held on August 19th.

The staff of the Department, besides the Director-General, Mr. Ednie Brown, consists of a consulting Botanist, two inspecting Foresters, a 'relieving officer' (See p 395 of Vol. XVIII—we wonder how he likes relieving the Directer General one day and an Assistant Forester the month after!), 27 Foresters, 5 Assistant Foresters, 2 Acting Foresters and office staff.

Bengal Statistics.

We have received an Official Volume of 'Agricultural Statistics for the Lower Provinces for 1891-92.' The only thing of interest to us is the area of Forest and Waste Land. That of *forest* is given as 4,550,601 acres but these are presumbly only the forests under the Department as 'Reserved' or 'Protected.' A further area of 35,862,957 acres is shown under the combined heads of (2) not available for cultivation (3) culturable Waste and (4) current fallows, but the greater part of this is presumably under the Permanent Settlement.

The Dacca District, Bengal.

We have received copy of a "Report on the system of agriculture in the Dacca District" by A. C. Sen, C.S., which we have looked through with considerable interest. It is unusual in its style and is a refreshing change from the usual dullness of such reports, being full of useful and interesting information. More especially interesting is the series of reprints of old maps of the Dacca country shewing the changes in the courses of the rivers and in physical features during the past century or more. The book has lists of the fauna of the District which are carefully compiled but would be more valuable if they had been corrected and arranged by a Zoological expert. The history of the river-bed

changes is also interesting. As regards Forests, the only reference is the description of the Madhupur Jungle which occupies the high land between Dacca and Mymensingh. We have never visited this interesting piece of forest which is, we suppose, Zemindari property, for the District is under the Permanent Settlement, but we are surprised to hear that it contains gigantics trees and is infested with wild beasts. The description gives us little or no information about this Jungle and so is unsatisfactory. It would have been an interesting thing to have tol l us of what its vegetation consists, what are its products and its market, and how it is managed.

V.—EXTRACTS, NOTES & QUERIES.

The National Government and the National Forests in America.

In his annual message, the President of the Unite l States commends to the attention of Congress the statements relating to forestry which are contained in the report of the Secretary of the Interior, and he adds that "the time has come when efficient 'measures should be taken for the preservation of our forests from 'indiscriminate and remediless destruction." The President might have said that this time actually arrived many years ago ; and we should have been pleased if he had considered the subject of sufficient importance to warrant more than a perfunctory notice. Turning to the report of Secretary Smith, we find that he recommends legislation which may "lay the foundation for a wise and 'comprehensive forestry system to be applied to the timber on the 'public land and to the forest-reservations," and he ventures the opinion that "the creation of a forestry commission, in connection 'with the Land Office, looking towards the education and use in 'this work of men thoroughly suited for it, is already needed." We agree with the Secretary as to the urgent necessity of a commission of forest-experts, although we are hardly sure that we fully comprehend precisely what functions it is to fulfil in Mr. Smith's scheme of forest administration. Five years ago *Garden and Forest* proposed, in outline, a policy which was : (1) To withhold from sale and entry forest-lands on the national domain until a thorough examination had been made to show what timber tracts could be put upon the market without injury to the country's highest interests. Meantime in order to protect the forest, it was advised (2) that the guardianship and defense of the nations' forests should be entrusted to the army of the nation until a sufficient number of adequately trained and equipped foresters could

be provided for the administration of a permanent forest-policy. In connection with this we urged (3) the appointment by the President of a Commission to examine into the condition of the forests in all their relations to agriculture, public health and water-supply, so that an intelligent determination could be reached as to what portions of the forest on the public domain should be preserved for ever, and in what manner the remainder should be disposed of. We still believe that a scheme like this was practicable and desirable. It received the approval of the American Forestry Association, at its meeting in Philadelphia, as a wise preparation for systematic and permanent forest-management. But Congress never made any pretence of considering, much less of taking action on it, and never during all these years has made one honest effort to protect and perpetuate the forest supplies and forest influences which are so essential to the common weal. Meanwhile, mile after mile of timber-lands have passed into the control of lumber-men, whose sole interest is to remove the timber as rapidly and cheaply as possible. Timber-thieves have been cutting on the public domain, and no determined effort has been made to restrain them. Fires have devastated hundreds of thousands of acres, and private herds have grazed on public lands and destroyed the undergrowth of hundreds of thousands more. And yet nothing in the way of law, and very little in the way of an increased enlightenment of public sentiment, exists to-day to prevent these ravages from continuing indefinitely. To say that there has been no advance in public knowledge on this subject, would hardly be true, for, as the forest-area narrows, the apprehensions of coming timber-famine grow, and men become thoughtful. Something, too, has been done in the way of setting apart forest-reservations in accordance with a paragraph which was adroitly or luckily slipped in at the end of a bill where it did not properly belong. Certain it is, that neither the President nor his Secretary, need have any apprehension of being considered alarmists when they assert that legislation is needed at once.

In another part of his report, Secretary Smith, in writing of the national parks and reservations, invites attention to a state of affairs which will surprise those persons who have been flattering themselves that these reservations were under the protection of the army. It seems that during the summer, many complaints were made to the Department that stockmen had been driving sheep into the reserves, destroying the herbage and setting fire to the trees. The Commissioner of the General Land Office also invited the attention of the Department to the necessity of protecting these reserves, and urged that portions of the army be detailed to look after them until Congress could make suitable provision. Accordingly, the attention of the Secretary of War was directed to the facts, and he was requested to send a sufficient number of troops to protect the reservation. This request, however, was

declined because the Judge Advocate General of the Army had decided that the employment of troops in such cases and under the circumstances described would be unlawful. The reservations, therefore, remain, with the same protection which is extended to other unreserved public lands, and no more. When the attention of the Judge Advocate General was invited to the fact that officers had been already detailed to protect certain national parks and forest-reservations, he replied that such detail was clearly an oversight on the part of the War Department at that time, and he added that "there is no express authorization by the constitution 'or by Act of Congress for the troops to be used for the purpose of 'executing the laws relating to these reservations, and it is therefore 'unlawful to do so." It will be seen, therefore, that even the imperfect policing which it had been supposed a handful of cavalry could give to an area as large as some of our states, is no longer to be hoped for.

Here, certainly, is need of immediate action. Congress should not delay an hour the passage of an Act to authorize and direct the Secretary of War to make necessary details of troops to protect the national parks and reservations which have been established under an Act of Congress, or which may hereafter be set apart as public forest-reservation by the President of the United States. These reservations are the property of the people, and they have a right to demand that the army shall be used to defend this property from trespassers or intruders who destroy the woods or kill the game or in any way mar the beauty or impair the value of what has been dedicated to their use and enjoyment for ever.

The issues which now absorb public attention, and which this Congress must meet, are grave and urgent, it is true; but the wisest possible action of our representatives in regard to the tariff or the currency or taxation or our relations with foreign powers, or to all of them combined, would not do as much to advance public prosperity as would the adoption of some measure laying broad and deep foundations for a stable and efficient forest-policy. —(*Garden and Forest*)

Wood Paving.

The subject of wood paving for the streets of our large towns referred to in Volume XIV page 780, of the *Gardeners' Chronicle*, has occupied so much attention of late that a few additional remarks on the subject may be useful. So long ago as 1889, the question of the superiority of Jarrah (*Eucalyptus marginata*, not *rostrata*) over Karri (*E. diversicolor*) was contested by those who were interested in the woods being adopted by the vestries of Islington, Chelsea, and Lambeth, and by the District Board of St. Martins-in-the-Fields. The correspondence on this matter was published in the Kew Bulletin for September, 1890. Since that

time, the vestry of St. Pancras has used Jarrah wood to some extent, and it has been adopted by other public bodies, notwithstanding its very high price in the first instance, as the wood arrives in this country already cut into the blocks fit for use. It is very necessary that these blocks should be cut from well seasoned and sound timber, for if they twist or warp on the voyage, they lose much of their value for a purpose where it is required that they should form a close and compact body when laid.

So recently as the 13th of last month (December) a paper was read before the Society of Arts by Mr. Lewis H. Isaacs, surveyor to the Board of Works for the Holborn District, on "Carriageway Pavements for large Cities," in which the subject of wood pavement was treated of. Referring to the work of one large company interested in promoting the application of wood for paving purposes, it is stated that the Company in question laid during the period from 1872 to 1889, 1,030,000 square yards, equal to an average of 58,000 square yards per annum, and from 1890 to 1893, 520,000 square yards or an average of 130,000 square yards per annum. Besides large areas in the Strand, Hackney, and St. George's Districts, carried out during the present year, wood paving has also been adopted in the City, Kensington, Chiswick, Kilburn and Hampstead. Leaving out of the question the subject of cost, as one of a practical character in which the readers of the *Gardeners' Chronicle* will not be specially interested, we quote Mr. Isaacs' opinion on the relative value of coniferous woods, and those of species of Eucalyptus. "Taken all round," he says, "the best wood to use for this purpose is Baltic 'red timber or yellow deal, which must be thoroughly sound and 'well-seasoned, absolutely free from sap, shake, knots, or other im-'perfections." Within the last few years there has been a strenuous endeavour to introduce denser and harder wood for paving purposes, notably Jarrah and Karri, but objection is taken to these woods that they are hard and slippery and also noisy. At a meeting of the Kensington Vestry on November 8th last, a report was submitted from the Works Committee stating that complaints had been received relative to the noise caused by the trial sections of Jarrah and Karri woods recently laid in the Brompton Road, and the Works Committee recommded that the sections of hard wood in question be removed, and creosoted deal blocks substituted therefor, and after some discussion, the recommendation was agreed to. The expense of these woods is almost prohibitive, the comparison being £10 10s. for yellow deal as against £23 10s. for Jarrah, so that Jarrah would require to last seventeen to eighteen years to be equal in price to yellow deal creosoted. Another serious disadvantage possessed by wood paving is, that it absorbs dirt and street deposits more readily than any other pavement, and gives off a sickening odour, especially under a powerful sun So that taking all things into consideration, the future of wood blocks for paving purposes

does not seem by any means ensured. In the paragraph in the *Gardeners' Chronicle* before referred to, it is stated that West Australian Red Gum is "coming to the front" for paving purposes. It would be interesting to know what species of Eucalyptus is here intended. The term Red Gum is applied to several species in Australia, the best known being *E. rostrata*, the wood of which equals Jarrah in strength and durability, but this species is not a West Australian one. The true Red Gum of West Australia is *E. calophylla*, but this wood, through used for many above-ground purposes, has a bad reputation for under ground work.—(*Gardeners' Chronicle.*)

Pension Rules of trained Officers.

In the newly issued Prospectus of the Cooper's Hill College the following occurs "The more favourable pension rules have 'recently been extended to Officers appointed from England, who 'are thus placed on an equality with Public Works Officers ap-'pointed from Cooper's Hill College. Any Forest Officer, who 'has rendered not less than three years' approved service as head 'of his department, has also been made eligible for an extra 'pension of Rs. 1,000 per annum.

It is very strange that the long expected orders have not issued in this country. It is tolerably clear from this that the special retirement rules of Public Works and Telegraph Officers appointed by the Secretary of State have at last been extended to Forest Officers, but of the details we know nothing and the above extract can only have been rather carelessly worded, for it can hardly be supposed that it is only the Inspector-General who is to get an extra Rs. 1,000 If the Forest Department is to be on the same footing as the others, the Inspector-General will get an extra Rs. 2,000 and Conservators of three years service Rs 1,000.

We hope the authorities will remember how many Forest Officers are anxious to hear what has been decided, and issue the orders without delay.

Impression of a duck found in a tree.

A correspondent writes to ask us to mention a curious circumstance which has happened near Ashford. Some 300 years ago a duck was seen to fly into a tree and not come out; the circumstance seemed strange and a stone was placed at the foot of the tree to record the event. The tree was recently felled and in cutting it up, the impression of a bird was found in the wood. We suppose it is quite possible that the duck may have got wedged into a hollow between two living branches which as they grew

together and the animal decayed, enclosed the impression of it. But the story is a curious one all the same. We have seen a photograph of the impression, which certainly bears out the statement of its cause.

Forest Fires in France.

The *Revue des Eaux et Forêts* for September last contains an account of numerous destructive forest fires which have taken place in France during the past year. Three of these fires which occurred in the Pine Forests of the Landes in April last, have been proved to be the work of an incendiary who finally confessing his crime was sentenced at the assizes to 5 years imprisonment and has also been prohibited from living in the neighbourhood for another 5 years. In August the whole of the Pine Forest of the Solferino estate, formerly the property of the Empress Eugenie, containing some 4,500 acres of wood, was burnt; the loss is estimated at over a million francs In the same month, destructive fires again occurred in seven different places in the Landes and over a considerable area of a forest in the Gironde. Again in September several fires are reported from the neighbourhood of Mont de-Marsan. An extensive fire also occurred in the Lot-et-Garonne destroying over 12,000 acres of pine forest in Pindères and the adjoining communes.

In the Lower Charente, too, fires have been numerous and in Provence three soldiers employed in putting out a forest fire were burnt, one of them perishing in the flames.

In Algeria, too, enormous damage has been done, the total area burnt on different occasions being estimated at 20,000 acres; indeed, so serious has the situation become in Algeria that the Governor has himself gone out to the districts from which these fires are reported.

A new tree-climbing Apparatus.

A private in a Russian regiment has, it appears, recently invented an instrument by means of which the clumsiest person can climb trees with the greatest facility. The utility of the instrument has been tested before the General of the Division, who made several soldiers fully equipped use it to climb trees and telegraph posts, stopping from time to time to fire their rifles It is thought that in these days of smokeless powder, the instrument may be of use in the defence of certain positions.

The instrument being reported to be light and easily carried, it is possible that it may prove very useful in lopping trees prior to felling them.

Flowering and Seeding of Forest Trees.

Mr. B. B. Osmaston writes from Pilibhit that the 'Asaina' (*Terminalia tomentosa*) has this year, in his District, produced an unusually heavy crop of seed. Speaking of this tree, we may note that this year the Forest School students found it in flower in the the Dún in January, though usually it does not flower until April.

Mr. F. A. Lodge writes from Kurnool that the male bamboo (*Dendrocalamus strictus*) seeded freely in the Nallamalais in 1893. The thorny bamboo (*Bambusa arundinacea*) seeded in the Seshachellam and Veligonda Hills of Cuddapah in 1891, and offsets planted out seeded at the same time as the parent clumps, but clumps that had been regularly thinned (furetage) for some years, did not seed. We should be grateful for further information and experience on this important point. Mr. R. McIntosh, writing from Cuddapah, says that both species are in flower this year. And in Burma *Dendrocalamus Brandisii*, *D. longispathus*, *Melocalamus compactiflorus* and *Thyrsostachys siamensis*, with a new, unnamed species, 'Wapyusan' are also all in flower.

In regard to bamboo seeding, it may also be noted that the big bamboos on the Rajpur road at Dehra Dún (*Dendrocalamus Hamiltonii*) are in full flower this year, while the graceful 'Chye' bamboos of the Dún Villages (*Bambusa nutans*) have also, sad to state, started flowering also.

Obituary.—R. H. C. Whittall.

It is with the greatest regret that we record the death of our old comrade of 'promotion,' the Conservator of Forests in the Punjab. Whittall was one of the eight selected candidates of the second year of the officers sent out by the Secretary of State. He had previously passed into Woolwich, but had given up the prospects of a career in the Artillery for the chances of Forest Work, and passed the Forest Department Entrance Examination in February 1869. He and the present writer and two others first spent eight months in practical work in the great forest of Haguenau in Alsace, which was then in its last year as a French possession, and was noted for its value as a training ground on account of its exceptionally well-prepared and model working plan, its beautiful woods of oak and Scots pine and its enthusiastic Inspector, M. Clément de Grandpré. From Haguenau we went to Nancy and after the usual two years, which were somewhat interrupted by the Franco-German war of 1870-71, and a brief sojourn of the two new 'promotions' in Scotland instead, Whittall passed out in 1871 and came out at once to India. He was first posted

to the Dún, where his father Dr. R. Whittall, so well known to all those who frequented Mussoorie and Dehra, as the sturdy old sportsman who managed the Tea Estate of Ambari, and who, himself only died in 1890, had settled. After a few years in the Dún and the hills of Jaunsar, Whittall was transferred to Burma, where he may be said to have spent the greater part of his service. From Burma he returned to the Central Provinces, and then after acting successively as Conservator in that Province and in Oudh, he was finally posted to the Punjab, where he remained till his death, which will be greatly regretted by his many friends in the Department and out of it. Full of energy and enthusiasm he probably overtaxed his strength, for he was attacked by an abscess in the liver, which, at last, after more than one operation, carried off our old friend.

VII—TIMBER AND PRODUCE TRADE.

The Teak Markets.

Richardson and Cruddas' Price List, Bombay. *February*, 1894.

TIMBER, VARIOUS—	Per ton of 50 cubic feet.
Teak Logs and Beams, 1st Class, Selected	Rs. Rs.
Under 12 in. Sidings ...	... 87 to 105
12 in. to 15 in. do. ...	... 105 to 113
Over 15 in. do. ...	... 110 to 118

	Per cubic foot. Rs. A.
Teak Scantlings, cut to sizes and lengths—	
Under 12 in. wide by 16 ft. long and under ...	2 14
Do any length above 16 ft. and up to 25 ft.	3 2
12 in. and over by 16 ft. long and under ...	3 2
Do. any length above 16 ft. and up to 25 ft.	3 6
Teak Sleepers and Girder Beds, cut to sizes and lengths—	
Under 12 in. wide	2 8
12 in. to 15 in. wide	2 13
Over 15 in. to 18 in. wide	3 2

Teak Boards, cut to sizes and lengths—

Under	12 in.	wide by 2 in.	thick and	under	3 2
12 in. to	15 in.	do. „	do.	do....	3 8
15 in. to	18 in.	do. „	do.	do....	4 0

Teak Planks, cut to sizes and lengths—

Under	12 in.	wide by over 2 in.	to 3 in.	thick	2 14
12 in. to	15 in.	do. „ do.	do.	do.	3 6
15 in. to	18 in.	do. „ do.	do.	do.	3 12

Messrs. Denny, Mott, & Dickson report:—The small dock deliveries for the month accentuate the dull state of the rolling stock demand, and there seems little prospect of any immediate improvement in this direction.

Shipbuilders, both in the United Kingdom and on the Continent, have booked some fair orders during last month, and nearly all teak cargoes afloat have been sold—partly perhaps, in consequence of such orders, and partly because of the growing conviction that a very large addition to the strength of H. M. Navy is inevitable, and cannot be covered by the 9,000 loads of teak now under contract with H. M. Admiralty, unless some battle-ships are given out to private yards which would none the less necessitate an ncreased demand for teak.

The more hopeful outlook has already caused an advance in prices at the shipping ports, and it is difficult to say to what extent shippers will carry the movement until, at least, the new naval programme has been officially declared.—(*Timber Trade Journal.*)

Churchill and Sim's Circular.

February 2nd, 1894.

East India Teak.—The month's delivery has been 425 loads against 628 loads in January last year. Recent arrivals have increased the dock stocks in London, but there has been rather more business about and prices have to some fractional extent felt the stir.

Rosewood.—Some important sales have been made, but at a reduction in prices.

Satinwood.—For large and figury logs there is some enquiry, but very little demand for plain wood, and not any for *planks* and *boards.*

Ebony—Is in better demand, and moderate shipments, of good logs, might be made.

PRICE CURRENT.

Indian Teak	per load	£9-10s.	to	£15-10s.
Satinwood	per ton	£6.	to	£12
Rosewood	,,	£5.	to	£8
Ebony	,,	£6.	to	£8

MARKET RATES OF PRODUCTS.

(Tropical Agriculturist, February 1894.)

Cardamoms,	per lb.	2s.	to	2s.6d.
Croton seeds	per cwt.	26s.	to	27s.6d.
Cutch	,,	20s.	to	32s.
Gum Arabic, Madras	,,	15s.	to	45s.
Gum Kino	,,	£15	to	£18
India Rubber, Assam	per lb.	1s.7d.	to	2s.3d.
,, Burma	,,	1s.7d.	to	1s.11d.
Myrabolams, Bombay	per cwt	9s.	to	11s.
,,	,,	4s.	to	4s.9s.
,, , Godavari	,,	7s.3d.	to	7s.6d.
Nux Vomica, good	,,	8s.	to	11s.
Orchella, Ceylon	,,	22s.	to	28s.
Redwood	per ton	£3.	to	£3-10s.
Sandalwood, logs	,,	£35	to	£55
,, chips	,,	£9	to	£30

Cawnpore Price Current.

January 25th, 1894.

	Per Maund.								
	R.	A.	P.		R.	A.	P.		
Aonla fruits—dried	0	12	0	to	0	12	6		
,, leaves dried, bruised ...	1	12	0	to	2	0	0		
Babul bark	0	7	0	to	0	8	0		
Bahera	1	10	0	to	1	12	0		
Lac, Stick	24	0	0	to	25	0	0		
Myrabolams	3	2	0	to	3	4	0		
Moonj grass	0	8	0	to	0	9	0		
Gum Babul	12	0	0	to	13	0	0		
,, Mixed	9	0	0	to	10	0	0		

X.—EXTRACTS FROM OFFICIAL GAZETTES.

1.—Gazette of India.

26th January, 1894.—No. 142 F.—The following transfers are ordered in the interest of the public service:—

Mr. F. O. Lemarchand, Deputy Conservator of Forests, 2nd grade, Punjab—to the Central Provinces.

Mr. F. S. Barker, Deputy Conservator, 4th grade, Central Provinces (on furlough)—to the Punjab.

2.—Madras Gazette.

26th January, 1894.—No. 36.—Mr. S. C. Moss, Acting District Forest Officer, Madura, privilege leave for three months, from 15th February 1894, under article 291 of the Civil Service Regulations.

30th January, 1894.—The following subordinates have passed the Departmental Test held in January, 1894:—

No.	Names.	Designation.	Subject in which passed.
1	R. Srinivasa Raghavachari	Forester, Chingleput ...	Code & Accounts.
2	T. B. Rajagopaul Mudaliar ...	Temporary Forester, North Arcot ...	Do.
3	K. Kailasa Aiyar ...	Clerk, District Forest Office, North Arcot ...	Do.
4	Vasudeva Reddy ...	Temporary Forester, North Arcot ...	Do.
5	C. Srinivasalu Naidu ...	Range Clerk, North Arcot	Do.
6	C. Narayanaswami Mudaliar ...	Temporary Forester, do.	Forest Law.
7	V. M. Varadarajulu Naidu	Clerk, North Arcot ...	Code & Accounts.
8	M. Ponnaranga Mudaliar	Forester, Nellore ...	Do.
9	L. Govindaswami Pillai	Forest Range Clerk, South Arcot ...	Do.
10	D. Srinivasa Chari ...	Range Clerk, South Arcot	Do.
11	D. J. Evers ...	Temporary Forester, Salem	Do.
12	M. Subramania Aiyar ...	Acting Forester, Trichinopoly ...	Do.

16th February, 1894.—No. 67.—The notification granting three months' privilege leave to Mr. S. C. Moss, Extra Assistant Conservator of Forests, published at page 113 of Part I of the *Fort St. George Gazette*, dated 30th January, 1894, is hereby cancelled.

11*th February*, 1894 — Mr. S. C. Moss, Extra Assistant Conservator of Forests, 2nd Grade, is transferred from Tinnevelly to South Canara.

12*th February*, 1894.—V. Mukyaprana Row, Forester, 4th Grade, Vizagapatam District, passed the Departmental Examination in Forest Law, Code and Accounts held in January 1894.

16*th February*, 1894.—The leave of absence to Ranger Jambunada Sastri, notified at page 83, Part II, of the *Fort St. George Gazette* of, 23rd January, 1894, is extended by another month, *i e*, up to 27th February, 1893.

3.—Bombay Gazette.

26*th January*, 1894.—Mr. B. H. Dalal, L.C.E., Sub-Division Forest Office, West Khandesh, delivered over charge of his office, and duties to Mr. H. W. Keys, Divisional Forest Officer of West Khandesh, on the 10th January 1894, after office hours, and proceeded on one month's privilege leave granted to him by the undersigned.

27*th January*, 1894.—No. 721.—Mr. G. M Hodgson, Assistant Conservator of Forests, First Grade, and Working Plans Divisional Forest Officer, Kanara, is allowed privilege leave of absence for three months from 14th February, 1894, or such subsequent date as he may avail himself thereof.

30*th January*, 1894.—No. 763.—Mr. J. H. Clubby, Extra Assistant Conservator of Forests, Third Grade, passed an examination in Surveying according to the test prescribed in Rule of 6 of the old rules published in Government Notification No. 2,878, dated 4th June, 1880, for the examination of Forest Officers.

Mr. Chunilal Gulabchand Dalia, L C.E., acting Extra Assistant Conservator of Forests, Fourth Grade, and Sub-Division Officer, Surat, has been allowed one month's privilege leave from the 17th January, 1894.

Mr. C. G. Dalia, acting Extra Assistant Conservator of Forests, Fourth Grade, and Mr. W. A. Wallinger, Divisional Forest Officer, Surat, respectively delivered over and received charge of the Sub-Division Office, Surat, on the 17th January, 1894, before noon.

2*nd February*, 1894.—No 843.—His Excellency the Governor in Council is pleased to appoint Mr. Haripal Mitra, L.C.E., Extra Assistant Conservator of Forests, Second Grade, to hold charge of the office of Working Plans Divisional Forest Officer, S.C., during the absence of Mr. C M. Hodgson on privilege leave or pending further orders.

13*th February*, 1894.—Mr. W. F. D. Fisher, Assistant Conservator of Forests, Second Grade, and Divisional Forest Officer, Panch Mahals, has been granted one month's privilege leave from the 13th February, 1894.

15*th February*, 1894.—No. 1,245.—His Excellency the Governor in Council is pleased, with effect from the date of this order :—

to suspend the lien of Mr. J M. Fernandez, First Grade Extra Asisstant Conservator of Forests, on his British appointment

to promote Mr. R. H. Madan, L.C E., to be First Grade Extra Assistant Conservator of Forests, *vice* Mr. Fernandez ;

to appoint Mr. B. H. Dalál, L.C.E., to be substantive *pro tem*. Second Grade Extra Assistant Conservator of Forests *vice* Mr. Madan.

19*th February*, 1894.—Mr. L. D. Joshi. Extra Assistant Conservator of Forests, having delivered over charge of the Sub-Division Office Poona, to Mr. Clabby on the 6th January last, reported himself for duty to the Divisional Forest Officer of Nasik on the 13th idem, before office hours.

5—N. P. W. AND OUDH GAZETTE.

No. 286.—Mr. Raghunath Pathak, Extra Assistant Conservator of Forests, attached to the Direction Division of the Central Circle, privilege leave for one month, with effect from the 20th February, 1894.

12*th February*, 1894.—No. 386.—Mr. E. McA. Moir, Deputy Conservator of Forests, in charge of the Jaunsar Forest Division of the School Circle, furlough out of India for eight months, with effect from the 10th March, 1894.

12*th February*, No. 390.—Mr. B. B. Osmaston, Assistant Conservator of Forests, in charge of the Philibit Forest Division of the Oudh Circle, on being relieved by Mr J. M. Blanchfield, to the charge of the Jaunsar Forest Division of the School Circle.

12*th February*, 1894—No.394 Mr. J. M. Blanchfield, Extra Assistant Conservator of Forests, attached to the Gorakhpur Forest Division of the Oudh Circle, to the charge of the Pilibhit Forest Division of the same Circle, until further orders.

15*th February*, 1894.—No. 449.—Mr Keshavanand, Extra Assistant Conservator of Forests, attached to the Direction Division of the Oudh Circle, is appointed Working Plans Officer, with effect from the 1st November, 1893.

6—PUNJAB GAZETTE.

25*th February*, 1894 —No. 79.—Mr E. M. Coventry, Assistant Conservator of Forests, transferred from Berar to the Punjab, reported his arrival in Lahore on the forenoon of the 5th December, 1893, and was attached to the Working Plans Division with effect from that date

2*nd February*, 1894.—No. 96.—With reference to the Notification of the Government of India, Revenue and Agricultural Department, No. I F., dated the 2nd January, 1894, the following officers are appointed Assistant Conservators of the 2nd Grade on the amalgamated list of Forest Officers for the Punjab, Central Provinces, Berar and Coorg with effect from the dates entered against their names:—

Mr. R. M. Williamson	...	16th November 1893.
Mr. R. C. Milward	...	27th November 1893.
Mr. F. Linnell	...	27th November 1893,
Mr. C. O. Hanson	...	27th November 1993.

3rd February, 1894.—No. 103.—Mr. E. M. Coventry, Assistant Conservator of Forests, Punjab, passed the prescribed Departmental Examination in Hindústáni by the Higher Standard on the 23rd January, 1894.

6th February, 1894.—No. 116.—Under the provisions of Section 2 of the Indian Forest Act, VII of 1878, and in supersession of *Punjab Government Gazatte* Notification No. 489, dated 22nd September, 1893, the Hon'ble the Lieutenant-Governor is pleased to appoint the Chief Commissariat Officer, Sirhind District, Umballa, to be a Forest Officer in respect of Bír Chappar (or Dhantauri) and Bír Sujra, which have been declared to be Reserved Forests by Notification No. 435, dated 14th August, 1893.

15th February 1894.—No. 134—Consequent on the transfer of Mr. F. O Lemarchand, Deputy Conservator of Forests, to the Central Provinces (*vide* Government of India Notification No. 142 F. of 26th January 1894), Mr. C. Somers Smith, Officiating Deputy Conservator of Forests, assumed charge of the Kángra Forest Division on the afternoon of the 6th February, 1894.

20th February, 1894.—No. 150.—Mr. J. Ballantine, Deputy Conservator of Forests, 2nd Grade, on deputation, proceeded on two years furlough with effect from the 16th June, 1893.

Mr. Ballantine's deputation to His Highness the Nizám's Dominions ceased on 16th June, 1893.

Consequent on the above, the following reversions will have effect from 16th June, 1893 :—

Mr. L. G. Smith, Provisional Deputy Conservator of Forests 3rd Grade, and Officiating Deputy Conservator of Forests, 2nd Grade, to Deputy Conservator of Forests, 4th Grade, and Officiating Deputy Conservator of Forests, 2nd Grade.

Mr. R. J. P. Pinder, Provisional Deputy Conservator of Forests, 4th Grade, and Officiating Deputy Conservator of Forests, 3rd Grade, to Assistant Conservator of Forestst 1st Grade.

Mr. A. M. F. Caccia, Provisional Assistant Conservator of Forests, 1st Grade, and Officiating Deputy Conservator of Forests, 4th Grade, to Assistant Conservator of Forests, 2nd Grade, and Officiating Deputy Conservator of Forests, 4th Grade.

Punjab Government Notification No. 639, dated 9th December, 1893, is hereby cancelled.

No. 15.—The following statement showing the names and position of officers on the amalgamated list on the 21st July, 1893 should be subsituted for that published with Punjab Government Notification No. 670, dated 13th December, 1893 :—

Sanctioned scale.	Names.	Position
Deputy Conservator of Forest 1st Grade (4)	1. J. C. McDonell ...	On deputation.
	2. F. B. Dickinson	On furlough.
	3. C. F. Elliott ...	Deputy Conservator of Forests, 1st Grade.
	4. J. McKee ...	Officiating Conservator of Forests.
Deputy Conservators of Forest, 2nd Grade (5)	5. G. G. Minniken...	Provisional Deputy Conservator of Forests, 1st Grade.
	6. W. P. Thomas ...	Officiating Deputy Conservator of Forests, 1st Grade.
	7. E. Forrest ...	Ditto.
	8. L. A. W. Rind ...	Deputy Conservator of Forests, 2nd Grade.
	9. F. O. Lemarchand	Ditto.
Deputy Conservators of Forests, 3rd Grade (5)	10. G. F. Prevost ...	Provisional Deputy Conservater of Forests, 1st Grade.
	11. J. Ballantine ...	On furlough.
	12. E. Dobbs ...	On sick leave.
	13. W. King ...	Officiating Deputy Conservator of Forests, 2nd Grade.
	14. A. M. Reuther ...	On furlough.
Deputy Conservators of Forests, 4th Grade (8)	15. J. H. Lace ...	Ditto.
	16. L. G. Smith ...	Officiating Deputy Conservator of Forests, 2nd Grade.
	17. F. S. Barker ...	On sick leave.
	18, H. Moore ...	On furlough.
	19. G. F. Taylor ...	Officiating Deputy Conservator of Forests, 3rd Grade.
	20. A. L. McIntire...	Ditto
	21. H. A. Hoghton ...	Ditto
	22. H. Calthrop ...	Ditto
Assistant Conservators of Forests 1st Grade (8)	23. F. C. Hicks ...	Provisional Deputy Conservator of Forests, 4th Grade and Officiating Deputy Conservator of Forests 3rd Grade.
	24. R J. P. Pinder ...	Officiating Deputy Conservator of Forests, 4th Grade.
	25. A. E. Lowrie ...	Ditto.
	26. C. S. Smith ...	Ditto.
	27. G. S. Hart ...	Ditto.
	28. C. P. Fisher ...	Ditto.
	26. A. V. Monro ...	Ditto.
	30 A. W. Blunt ...	Ditto.
	31. P. H. Clutterbuck	Provisional Asst. Conservator of Forests, 1st Grade, and Officiating Deputy Conservator of Forests, 4th
Assistant Conservators of Forests 2nd Grade (7)	32. A. M. F. Caccia ...	Officiating Asst. Conservator of Forests, 1st Grade.
	33. E. M. Coventry...	On examination leave.
	34. H. S. K. Edie ...	Officiating Asst. Conservator of Forests, 1ts Grade.
	35—37 Vacant.	

No. 152.—In Punjab Government Notification No. 641, dated 9th December, 1893, *for* "Mr. A. M. F. Caccia Provisional Assistant Conservator of Forests, 1st Grade," *read* "Mr. A. M. F. Caccia, Officiating Assistant Conservator of Forests, 1st Grade."

No. 153.—In Punjab Government Notification No. 671, dated 16th December, 1893, *for* "Mr. R. J. P. Pinder, Provisional Deputy Conservator of Forests, 4th Grade," *read* "Mr. R J. P. Pinder, Officiating Deputy Conservator of Forests, 4th Grade."

No 354.—Consequent on the return from furlough of Mr. H. Moore, Deputy Conservator of Forests, 4th Grade, the following changes will have effect from 22nd August, 1893 :—

Mr. H Moore, Deputy Conservator of Forests, 4th Grade, to Officiating Deputy Conservator of Forests, 3rd Grade;

Mr. R J P Pinder, Officiating Deputy Conservator of Forests, 3rd Grade, to Officiating Deputy Conservator of Forests, 4th Grade;

Mr. H. S. K. Edie, Officiating Deputy Conservator of Forests, 4th Grade, to Officiating Assistant Conservator of Forests, 1st Grade.

Punjab Government Notification No. 672, dated 16th December, 1893, is hereby cancelled.

No. 155.—In Punjab Government Notification No. 673, dated 16th December 1893, *for* "Mr. R. J. P. Pinder, Provisional Deputy Conservator of Forests, 4th Grade," *read* "Mr. R. J. P. Pinder, Officiating Deputy Conservator of Forests, 4th Grade."

No. 156.—In Punjab Government Notification No. 642, dated 9th December, 1893, *for* "Mr. A. M. F. Caccia, Provisional Assistant Conservator of Forests. 1st Grade, and Officiating Deputy Conservator of Forests, 4th Grade," *read* "Mr. A. M. F. Caccia, Assistant Conservator of Forests, 2nd Grade, and Officiating Deputy Conservator of Forests, 4th Grade"

No. 157.—In Punjab Government Notification No. 643, dated 9th December, 1893. *for* "Mr. L. G. Smith, Provisional Deputy Conservator of Forests, 3rd Grade, and Officiating Deputy Conservator of Forests, 2nd Grade, *read* "Mr. L. G. Smith, Deputy Conservator of Forests, 4th grade and Officiating Deputy Conservator of Forests, 2nd Grade.

No. 158.—Consequent on the return from sick leave of Mr. Dobbs. Deputy Conservator of Forests, 3rd Grade, the following charges will have effect from 25th October 1893:—

Mr. Dobbs, Deputy Conservator of Forests, 3rd Grade, to Officiating Deputy Conservator of Forests. 2nd Grade;

Mr. G. F. Taylor, Officiating Deputy Conservator of Forests, 2nd Grade, to Officiating Deputy Conservator of Forests, 3rd Grade.

Mr. R. J. P. Pinder, Officiating Deputy Conservator of Forests, 3rd Grade, to Officiating Deputy Conservator of Forests 4th Grade.

Punjab Government Notification No. 645, dated 9th December, 1893, is hereby cancelled.

No 159.—In Punjab Government Notification No. 647, dated 9th December 1893, *for* "Mr. J. P, Pinder, Provisional Deputy Conservator of Forests, 4th Grade," *read* "Mr. R. J. P. Pinder, Officiating Deputy Conservator of Forests, 4th Grade."

No. 160.—Consequent on the return from privilege leave of Mr. H. A. Hoghton, Officiating Deputy Conservator of Forests, 3rd Grade, the following reversions will have effect from 27th November 1893 :—

Mr. R. J. P. Pinder, Officiating Deputy Conservator of Forests, 3rd Grade, to Officiating Deputy Conservator of Forests, 4th Grade ;

Mr. A. M. F. Caccia, Officiating Deputy Conservator of Forests, 4th Grade, to Officiating Assistant Conservator of Forests, 1st Grade ;

Mr. H. S K. Edie, Officiating Deputy Conservator of Forests, 4th Grade, to Officiating Assistant Conservator of Forests, 1st Grade ;

Punjab Government Notification No. 643, dated 9th December 1893, and No. 17, dated 6th January 1894, are hereby cancelled.

No. 161.—Consequent on the return from privilege leave of Mr. F. O. Lemarchand, Deputy Conservator of Forests, 2nd Grade, the following reversions will have effect from 8th December 1893 :—

Mr. L. G Smith, Officiating Deputy Conservator of Forests, 2nd Grade, to Officiating Deputy Conservator of Forests, 3rd Grade ;

Mr. H. Moore, Officiating Deputy Conservator of Forests, 2nd Grade to Officiating Deputy Conservator of Forests, 3rd Grade;

Mr. F. C. Hicks, Provisional Deputy Conservator of Forests, 4th Grade, and Officiating Deputy Conservator of Forests, 3rd Grade, to Provisional Deputy Deputy Conservator of Forests, 4th Grade ;

Mr. P. H. Clutterbuck, Provisional Assistant Conservator of Forests, 1st Grade, and Officiating Deputy Conservator of Forests, 4th Grade, to Provisional Assistant Conservator of Forests, 1st Grade

Punjab Government Notification No. 18, dated 6th January 1894, is hereby cancelled.

No. 162.—In Punjab Government Notification No. 19, dated 6th January 1894, *for* "Mr. A. M. F. Caccia, Provisional Assistant Conservator of Forests, 1st Grade," *read* Mr. A. M. F. Caccia, Officiating Assistant Conservator of Forests, 1st Grade."

No. 163.—In Punjab Government Notification No. 53, dated 19th January 1894, *for* "Mr. L. Gisborne Smith, Provisional Deputy Conservator of Forests, 3rd Grade,," *read* "Mr. L. Gisborne Smith, Officiating Deputy Conservator of Forests, 3rd Grade.

7.—Central Provinces Gazette.

20*th January*, 1894.—No. 537.—Mr. M. Muttannah, Extra-Assistant Conservator of Forests, returned from the three months' privilege leave granted him by Notification No. 3944, dated the 22nd August 1893, and, with reference to Order No. 218, dated the 11th January 1894, assumed charge of the Nimar Forest Division from Mr. Mohammad Kadir Bakhsh, Extra-Assistant Conservator of Forests, on the afternoon of the 30th December 1893.

8*th February*, 1894.—No. 636.—Privilege leave for two months and twenty-nine days, under Article 291 of the Civil Service Regula-

tions, is granted to Mr. L. A. W. Rind, Deputy Conservator of Forests, Narsinghpur, with effect from the 2nd March 1894, or from such subsequent date as he may be permitted to avail himself of it.

6*th February* 1894.—No. 1.—With the previous approval and sanction of the Chief Commissioner, Central Provinces, the following Forest Rangers are posted as Working-Plans Assistants to the Forest Division entered against their names :—

Mr. A. T C. Howell	...	Nimar.
,, Faiz Baksh	...	Damoh.
,, S. R. Parsons	...	Jubbulpore.
,, Amrit Lall Chatterji	...	Narsinghpur.

15*th February* 1894.—No. 813.—*Corrigendum*.—In Notification No. 444, dated the 20th January 1894, *for* "Mr. F. O. Lemarchand, Deputy Conservator of Forests, 3rd grade, Punjab," *read* "Mr. F. O. Lemarchand, Deputy Conservator of Forests, 2nd grade, Punjab."

8.—Burma Gazette.

19*th January* 1894.—No. 1.—With reference to this office Notification No. 35, dated the 12th December 1893, Mr. H. H. Forteath, Assistant Conservator of Forests, assumed charge of the Paungbyin subdivision, Upper Chindwin division, from Mr. C. W. A. Bruce, Assistant Conservator of Forests, on the forenoon of the 12th December 1893.

20*th January*, 1894.—No. 20.—The following transfers are ordered in the Forest Department :—

Mr. F. W. Thellusson, Deputy Conservator of Forests, from Minbu to the charge of the Thayetmyo forest division.

No. 16.—The Chief Commissioner directs that, with effect from the 1st February 1894, the Rangoon Forest division shall be divided into two divisions, to be called respectively the Pegu Forest Division, with headquarters at Pegu, and the Rangoon Forest division, with headquarters at Rangoon.

The local limits of the Pegu Forest division shall be those of the Pegu district, and the Upper Zamayi reserve. The local limits of the Rangoon Forest division shall be those of the Hanthawaddy district.

No. 17.—Mr. W F. L. Tottenham, officiating Deputy Conservator of Forests, is posted to the charge of the Pegu Forest division.

24*th January* 1894.—No. 18.—The following temporary alterations of rank are ordered in the Forest department :—

(1) With effect from the 17th December 1893, in consequence of the return from leave of Mr. H. Carter, Assistant Conservator of Forests :

Mr. H. Carter, Assistant Conservator, 1st, to officiate as Deputy Conservator, 4th grade.

Mr. W. T. T. McHarg, Assistant Conservator, 1st, officiating Deputy Conservator, 4th grade, to revert to his substansive appointment.

Mr. R. C. Dun, Assistant Conservator, 2nd, officiating 1st grade, to revert his substantive appointment.

(2) With effect from the 23rd December 1893, in consequence of the return from leave of Mr. Hauxwell, Deputy Conservator of Forests

Mr. J. C. Murray, Deputy Conservator, 3rd, officiating 2nd grade, to revert to his substantive appointment.

Mr. A. F. Gradon, Deputy Conservator, 4th, officiating 3rd grade, *seconded*, to revert to his substantive appointment.

Mr. G. Q. Corbett, Deputy Conservator, 4th, officiating 3rd grade, to revert to his substansive appointment.

Mr. W. F. L. Tottenham, Assistant Conservator, 1st, officiating Deputy Conservator,, 4th grade, to revert to his substantive appointment.

Mr. A. M. Burn-Murdoch, Assistant Conservator, 2nd officiating 1st grade, to revert to his substantive appointment.

(3) With effect from the 25th December 1893 in consequence of the return from leave of Mr. Carr, Deputy Conservator of Forests :—

Mr. E. S. Carr, Deputy Conservator. 3rd grade, to officiate as Deputy Conservator, 2nd grade.

Mr. A Weston, Deputy Conservator, 3rd, officiating 2nd grade, to revert to his substantive appointment.

Mr. C. E. Muriel, Deputy Conservator, 4th, officiating 3rd grade, to revert to his substantive appointment.

Mr. E. A. O'Bryen, Assistant Conservator, 1st, officiating Deputy Conservator, 4th grade, to revert to his substantive appointment.

Mr. G. R. Long, Assistant Conservator, 2nd, officiating 1st grade, to revert to his substantive appointment.

3rd February 1894.—No. 39 —Mr. G. R. Long, Assistant Conservator of Forests, on special duty in the Kado division, is re-transferred to the charge of the Agency division, *vice* Mr. T. A. Hauxwell, Deputy Conservator of Forests, and is placed in charge of the AttaranYe subdivision of the Salween-Attaran division, in addition to his other duties.

6th January 1894.—No. 47.—On return from leave Mr. H. N. Thompson, Assistant Conservator of Forests, is posted to the charge of the Mingin subdivision, Lower Chindwin forest division.

No 48.—Mr. W. T. T. McHarg, Assistant Conservator of Forests, on being relieved by Mr. Thompson, Assistant Conservator of Forests, is posted to special duty in the Yaw forest division.

9th February 1894.—No. 56.—Mr. G. F. R. Blackwell, Assistant Conservator of Forests, is transferred from Shwegyin to the charge of the South Tenasserim division of the Tenasserim forest circle.

No. 57.—Mr. C. Ingram, Extra Assistant Conservator of Forests, is transferred from Tavoy to the charge of the Shwegyin division of the Pegu forest circle.

No. 58.—In exercise of the powers conferred by section 34, subsection (2) of the Upper Burma Forest Regulation, 1887, the chief Commissioner directs that conditions (2) and (5) of the conditions specified in Appendix II to the Rules under the Regulation published in Revenue Department Notification No. 140, dated the 19th April 1893, shall be modified as follows :—

To condition (2) the following words shall be added :

"At the time the timber is so marked this license shall be returned to the Forest official who marks the said timber."

For condition (5) the following shall be substituted :

"(5) That unless a commencement has been made in the utilization for the purpose specified of the timber for which this license is granted before the of 18 (*i.e.*, before the expiry of the period for which this license is issued), all timber that may have been felled or removed under this license shall lapse to Government.

17*th February* 1894.—No. 72.—Mr. J. Messer, Assistant Conservator of Forests, is posted as a temporary measure to the charge of the Shwegyin Forest division.

19*th February* 1894.—No. 2.—Mr. T. H. Aplin, Deputy Conservator of Forests, Lower Chindwin, division, made over, and Mr. C. B Smales, Assistant Conservator of Forests, assumed charge as a temprary arrangement of the Mingin subdivision on the afternoon of the 3rd February 1894.

9.—Assam Gazette.

6*th February*, 1894.—No. 1137G.—Mr. H. S. K. Edie, Assistant Conservator of Forests, Second Grade, who was transferred to Assam by Revenue and Agricultural Department Notification No. 44F., dated the 10th January 1894, is placed in charge of the Nowgong Forest Division.

20*th February*, 1894.—No- 1143G.—In superssesion of Notification Fo- 1143G., dated the 6th February 1894, published at page 108 of the *Assam Gazette* of the 4th idem, Mr. H. S. K. Edie, Assistant Conservator of Forests, Second Grade, who was transferred to Assam by Revenue and Agricultural Department Notification No. 45F., dated the 10th January 1894, is attached to the Kumrup Forest Division.

20*th February*, 1894,—No. 1644G.—Furlough for one year, under article 371 of the Civil Service Regulations, is granted to Mr. H. G. Young, Deputy Conservator of Forests, in charge of the Kamrup Forest Division, with effect from the 1st April 1894, or the subsequent date on which he may avail himself of it.

20*th February*, 1894.—No. 164 G.—Mr. H. S. K. Edie, Assistant Conservator, attached to the Kamrup Forest Division, is placed in charge of that Division during the absence on furlough of Mr. H. G. Young, or until further orders.

10—.Hyderabad Residency Gazette.

24*th January*, 1894.—No. 25.—Mr. E. M. Coventry, late an Assistant Conservator of Forests in Berar, was attached to the Direction Division as Working-Plans Assistant from the afternoon of the 11th to the forenoon of the 29th November 1893.

11 —Mysore Gazette.

7th February, 1894.—No. 13005—G. 2826.—The following transfers of Forest Officers are ordered :—

(1) Mr. C. E. M. Russell, Superintendent of Forests, Bangalore District, to be Superintendent of Forests, Kadur District : to join on being relieved.

(2) Mr. T. Abdul Karim, Head-quarter Assistant to the Inspector General of Forests, to be District Forest Officer, Mysore District, *vice* Mr. G. Sitaramaiya transferred.

(3) Mr. G. Sitaramaiya, Assistant Conservator of Forest, Mysore, District, to be District Forest Officer, Bangalore District, *vice* Mr. C. E. M. Russell : to join on being relieved.

(4) Mr. B Ramaswami Iyer, on Special duty in the Mysore District, to be District Forest Officer, Kolar District, *vice* Mr. B. Srinivasa Rao transferred : to join forthwith.

(5) Mr. R. Srinivasa Rao, Sub-Assistant Conservator of Forests, Kolar District, to be Sub-Division Forest Officer, Shikarpur Forest Sub-Division, *vice* Mr. M. G. Rama Rao : to join on being relieved.

(6) Mr. B Heera Singh, Sub-Assistant Conservator of Forest *Sub pro tem*, Kadur District, to be Sub-Division Forest Officer, Hunsur Forest Sub-Division, *vice* Mr. K. Shamaiengar : to join on being relieved.

(7) Mr. M G Rama Rao, Forest Probationer, Shikarpur, to be Sub-Division Forest Officer, Heggaddevankote : to join on being relieved.